AUG 22 1947

Occupational HAZARDS

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THERE'S PROFIT IN PREVENTION

AUGUST
1947

SEP 18 1947

ROUTE TO
OUR PLANT
E PROTECTION
EN: FEATURE
ECTION ON
E PROTECTION
R INDUSTRY

IN THIS ISSUE:

EYESIGHT ON THE NICKEL PLATE
. . . SAFETY VIOLATORS . . .
UNDERWRITERS' LABORATORY

AIR IN MOTION...

keeps men in motion...

Efficient dust control systems are truly important production tools. Dusty, fume-laden air dulls the efficiency of workers, damages machines, motors and bearings, curtails production.

In the plant of a noted chain and forging firm, for example, a KIRK & BLUM installation which replaced an old inefficient system improved working conditions to such an extent that it brought this comment from an official: "Our workmen can now work full time . . . this means added production for them and the company as well."

The illustration at the left shows a KIRK & BLUM system for castings grinding at the bench. Dust, sand and chips are removed as fast as produced. Note particularly turntable in center of bench which revolves work to operator so that he may work continuously. This results in better dust control . . . less lost motion.

Kirk & Blum's forty years of AIR ENGINEERING are at your service. Address: The Kirk & Blum Mfg. Co., 2802 Spring Grove Ave., Cincinnati 25, Ohio.

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"Dust Collecting Systems in Metal Industries"
"Blower Systems for Woodworking Plants"
"Fan Systems for Various Industries"
"Industrial Ovens"
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KIRK AND BLUM
DUST CONTROL

AN ORGANIZATION OF ENGINEERS & MECHANICS

A Kirk & Blum Down Draft Dust Control System in the plant of The Monarch Machine Tool Company, Sidney, Ohio.

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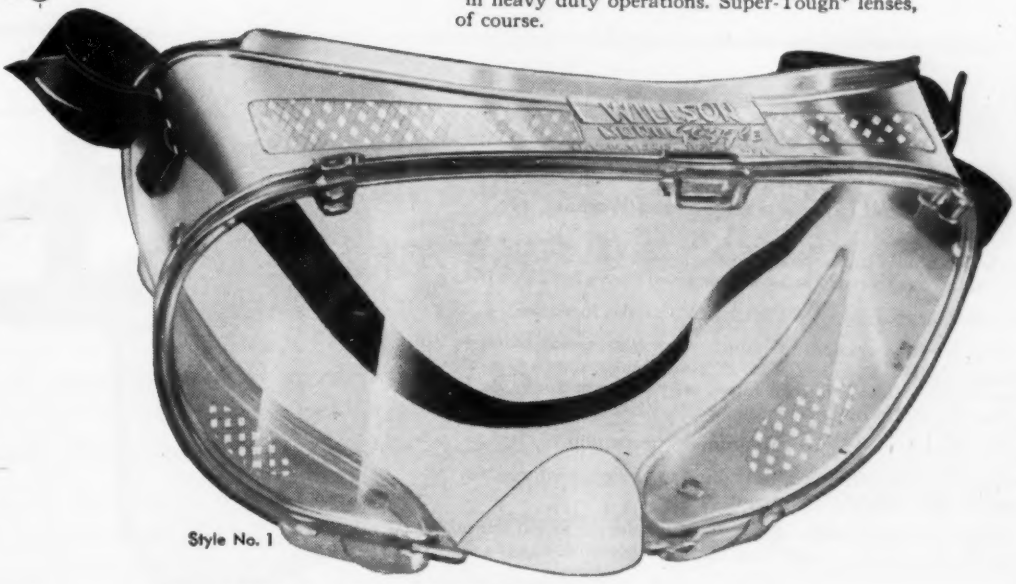
. . . get WILLSON

Style F350

COMFORT IS IN THE SADDLE . . . With this broad saddle nose bridge, there's less fatigue in wearing these goggles over long periods of time in heavy duty operations. Super-Tough* lenses, of course.



Style No. 1

AN OUNCE AND A QUARTER OF PREVENTION . . . Lightweight, form fitting MONOGoggle can be worn all day with comfort. Tru-Hue green or clear plastic full vision interchangeable lens has high impact strength.

Style No. 45D

THIS LIGHTWEIGHT TAKES ON ALL DUSTS . . . Large throw-away filter and flexible molded face piece assure easy breathing and comfortable, snug, face fit. U. S. Bureau of Mines Approved.

*Reg. U. S. Pat. Off.

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READING, PA., U.S.A. Established 1870

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JACKSON EYESHIELDS

to Protect Eyes and Face for Industrial SAFETY

Type BX

PATENTED

For All Gas Welding, Cutting and Brazing. Our present model has been improved in many respects.

Headgear and Cross Strap over top of head are made entirely of extruded plastic. They are moisture proof, will not shrink or warp, and may be thoroughly sterilized.

Multiple adjustment gives exact and lasting fit.

Leather *Sweat Band* gives added comfort.

Skull Cap of fireproof duck available at small extra cost. New *Headgear Pivot Assembly* is semi-permanent. Tension is locked in at the factory. No washers and nuts to back off and get lost.

Sturdy *Side Protectors* hold pivoted *Lens Retainer*, made of durable opaque molded plastic. Standard 2″ x 4⅛″ *Lenses* are held securely in place, yet are easily replaced. Available in F.S. shades from 3 through 6. Please specify shade desired.

Type J-1

For Metal Finishing, Metal Pouring, Spot, Gun, and Flash Welding, Wood Working, etc.

Present model has vastly improved *Headgear* made of extruded plastic. *Sweat Band* and *Pivot Assembly* same as described above for Type BX.

Improved plastic coated *Spark Deflector* protects the forehead.

Visor is made of fire repellent, flexible, clear Plastascele in three thicknesses: .020″, .030″ and .040″. Also in three shades of green: light, medium and dark in the .020″ thickness only. All are available in three depths: 4, 6 and 8 inches. Please specify when ordering.

All visors are 11 inches wide for "all around" protection.

All visors have a wire-reinforced gimp binding. Wire reinforcemen enables user to mold shield to his requirements.

Visor is attached to the outside of the Spark Deflector to withstand greater impact. Distance of visor from face is adjustable.

HEADREST SPECTACLES

LTB-50

For Light Welding, Cutting, and Brazing Operations

These spectacles are intended for general use where complete eye covering is unnecessary. They take 50 mm. lenses, shades No. 3 to No. 8.

All-plastic in design, yet of rugged construction, the headrest evenly distributes the weight over the entire head, thus relieving the usual pressure on the nose and face.

"LTB-50" can be comfortably worn over prescription glasses and is easily adjusted to fit any head . . . Distance between spectacles and eyes is also adjustable . . . All-round ventilation prevents fogging—provides greatly improved visibility.

Weldor can easily lift spectacles to "up" position, inspect his work, check his equipment. Then, with a flip of the finger, the spectacles are reset and "on guard."

Ask your Jackson dealer, or write to us . . .

JACKSON PRODUCTS

31739 Mound Road, Warren, Michigan

PRODUCTION SCHEDULES CAN SLIP ON SOAP!

Harsh or strongly alkaline soap can help upset the best-laid plans of management by slowing up high-stepping work schedules to a point where it hurts.

Not by bodily tripping up your workers, but through the impaired manual efficiency caused by a hand cleanser with an overdose of skin-injuring alkali.

With Lan-O-Kleen this isn't so! Lan-O-Kleen, a powdered soap, contains no harsh ingredients to harm the skin. Wherever soil and dirt dig deepest, Lan-O-Kleen loosens them with gentle thoroughness. Does it with the sponge-like action of its corn-meal granules—not by grinding attack on the skin surfaces.

Super-fatted with a generous degree of lanolin, Lan-O-Kleen gives extra protection against the skin drying out—leaving hands with a pliable, ready-to-work feeling.

Make Lan-O-Kleen a safety stand-by at workers' washstands. Consult one of over 475, West trained representatives throughout the country.

WEST DISINFECTING Company

Products That Promote Sanitation

42-16 West Street, Long Island City 1, New York, N. Y.

BRANCHES IN PRINCIPAL CITIES OF UNITED STATES AND CANADA

CLEANSING DISINFECTANTS • INSECTICIDES • KOTEX VENDING MACHINES
PAPER TOWELS • AUTOMATIC DEODORIZING APPLIANCES • LIQUID SOAPS

It's all in the line!

An efficient, smartly tailored uniform can mean increased production. The uniformed woman works better, because she feels better. And that's the reason these Hattie Snow smock and coat styles are so popular with women workers. They're comfortable, neat and protect clothes. Save time lost adjusting clothes. Eliminate hourly primping and preening. Keep men's eyes on their work. Check them in one department, or on a dozen of your own girls and see the difference in output per worker.

WITH ALL THESE IMPORTANT HATTIE SNOW FEATURES:

- **SAFE**—no strings, tabs, or loose ends to catch on machinery or equipment
- **SANFORIZED SHRUNK MATERIALS** for permanent perfect fit
- **BAR TACKED** (sturdy supporting stitching) at all points of stress
- **RUGGED, LONG-WEARING MATERIALS**
- **DOUBLE STITCHED SEAMS**

STYLED BY A WOMAN TO MEET A WOMAN'S NEEDS

#16
PRINCESS COAT
- *Puffed sleeve... long or short*
- *Two lower pockets and one upper*
- *Half belt in back*

FOR BETTER WORK WEAR

#6
BOXY SMOCK
- *Plain top—long sleeve*
- *Two lower pockets*

HATTIE SNOW UNIFORMS REG. U.S. PAT. OFF.

Send for Style File Catalog #116 and prices.

RANDLES MANUFACTURING CO., OGDENSBURG, N.Y.

For Clear Vision...

FOG-GLE CLOTH

RETARDS FOGGING
CLEANS—POLISHES

A chemically treated cloth to retard fogging and steaming of glass and plastic lenses in goggles, masks, shields, etc.

EASY TO USE
Practical — Economical

Also available in large "Transportation size" for use on automobile, truck and bus windshields.

•

Write for Bulletin H-87 and Free Sample for Test

IPCO
Safety Equipment for all Industries
INDUSTRIAL PRODUCTS COMPANY
830 N. FOURTH STREET • PHILADELPHIA 33, PA.

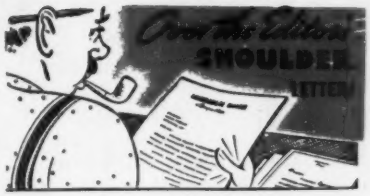
***One Man* Moves 5 Tons with the ANCHOR Puller-Jack!**

Pulls 15 Feet Without Changing Hold

Here's a one-man gang that quickly repays its price in labor, time and money saved. Has 3 tons direct pulling power, or 5 tons with sheave block. Can be operated upright, sideways or upside down, with lever pull away from load or toward it. Simple, strong, foolproof. Practically nothing to get out of order. Positive action, always holds. Compact, quick and easy to set up and use. Hundreds of uses for this powerful tool wherever heavy objects must be moved. Order an ANCHOR Puller-Jack today, or write for descriptive catalog.

$57.50 **F. O. B. Bowerston, Ohio. Jack complete with 3 ft. steel tube handle, 15 ft. load chain with slip hook, and release lock. Longer chains available.**

THE MINING SAFETY DEVICE CO.
DEPT. OG..... BOWERSTON, OHIO



Do you have any questions, theories or ideas concerning industrial health or safety? If you want to give them a good airing—send 'em along. We'll publish all space permits.

Welding Picture

OCCUPATIONAL HAZARDS:

May I bring to your attention in the photograph on page 47 of the June, 1947 issue of OH the "Industrial Fire Picture of the Month: Good Torch Practice," the assistant on the right of the cutter does not appear to be equipped with protective goggles. Since his distance from the cut is approximately the same as the distance of the cutter, it would seem also that the assistant should be supplied with protective goggles.—R. G. Elson, Physicist, Division of Industrial Hygiene, Department of Health, Toronto, Ontario.

Reader Elson is 100% correct in suggesting that the assistant should be supplied with protective goggles. We appreciate his comments and those of other readers who have called this to our attention. Attempting to emphasize fire prevention, we overlooked the man who should have been wearing properly shaded welding goggles.

"Proof Positive"

OCCUPATIONAL HAZARDS:

Enclosed is a picture of one of our

employees wearing a shield. It certainly saved this man's eyes from

(Continued on Page 35)

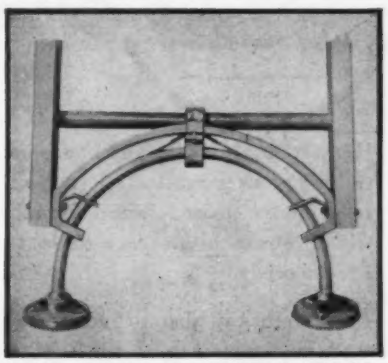
FOR SAFETY

No. 120 "Hollywood Turbans"

HOLLYWOOD TURBANS

Choose HOLLYWOOD TURBANS for the protection to women's hair so necessary in today's industrial plants. They end the danger of accidents from loose hair being caught in machinery. Adjustable to any head size. Washable, need no ironing. Women ENJOY wearing them! Write today.

Hollywood Turban Products Co.
Dept. OH
319 W. Van Buren St. Chicago 7, Ill.



THE MAN ON THE LADDER IS YOUR RESPONSIBILITY

Stay Safe With

SHUR-FOOT

AUTOMATIC LADDER LEVELER AND LOCKING BASE

SHUR-FOOT instantly and automatically adjusts to uneven ground surfaces and levels and locks securely in place. Applied in minutes—always ready for use. Write for details.

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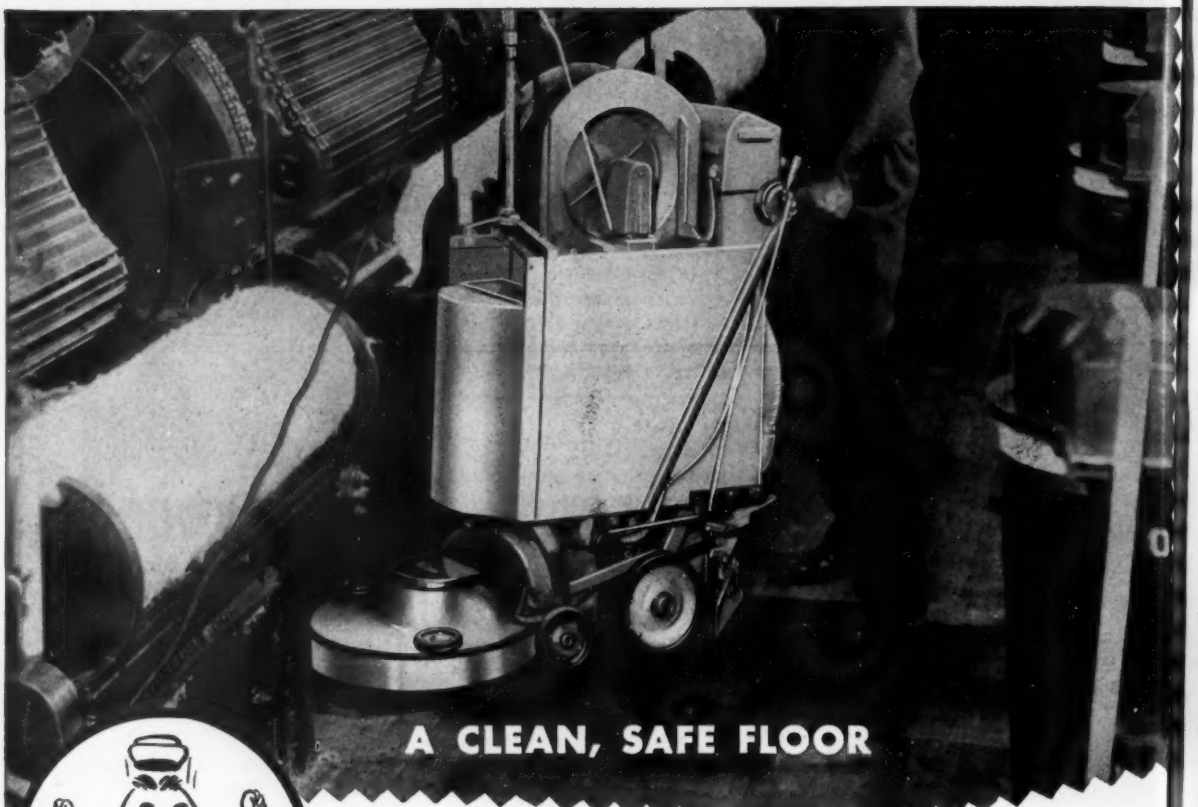

A CLEAN, SAFE FLOOR

Boosts Worker Morale

AIDS PRODUCTION!

High standards of plant housekeeping contribute to high worker productivity. So it is important to keep floors clean . . . and for still other reasons. Clean floors aid safety underfoot and reduce fire hazards.

It is important, also, to reduce floor-cleaning costs wherever possible. And it *is* possible, in many textile mills and factories, through the use of mechanical equipment that both scrubs and picks up. Even congested areas and narrow aisles can be cleaned in this manner with the compact *Finnell Scrubber-Vacuum* shown above. This is a complete cleaning unit *all in one.* It applies the cleaning solution (or scouring powder), scrubs, rinses if required, and picks up. Has a cleaning capacity of approximately 3,750 sq. ft. per hour. For use on larger, open-area floors, *Finnell* offers a *Self-Propelled Scrubber-Vacuum* that has a cleaning capacity up to 8,750 sq. ft. per hour!

Finnell makes floor-maintenance machines for every type of floor care—wet scrubbing, dry scrubbing, dry cleaning, waxing, and polishing. Also a full line of *Cleansers, Sealers,* and *Waxes,* as well as *Steel-Wool Pads, Mop Trucks,* and other accessory equipment.

For free floor survey, consultation, or literature, phone or write nearest *Finnell* branch or Finnell System, Inc., 3508 East Street, Elkhart, Indiana. Canadian Office: Ottawa, Ontario.

FINNELL SYSTEM, INC.

Pioneers and Specialists in

FLOOR-MAINTENANCE EQUIPMENT AND SUPPLIES

BRANCHES IN ALL PRINCIPAL CITIES

Occupational HAZARDS

VOLUME 9 • No. 10

THE STAFF

Editor
Jerry Close

Production Department
W. V. Linas

Circulation Department
E. J. Hexter

Art Department
A. R. Bouhall

General Manager
Edwin M. Joseph

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COVER: Pretty girls like Miss Loretta Marek usually pose for August pictures wearing their latest bathing suit creations. Protective Equipment Inc., Chicago safety jobbers, think, however, that Miss Marek's pose is one good way to remind everyone that protective equipment should be worn the year around. We agree on both counts!

"THERE'S PROFIT IN PREVENTION"

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BE CAREFUL!

Yes, we marvel at the amazing work of modern machines ... we say "they can almost think."

But they can't think. That's why Machine accidents occur ... unless the men who operate them do the thinking.

STONEHOUSE SIGNS

FOR ACCIDENT PREVENTION

help to prevent machine accidents by urging men to be careful on or around machinery ... to THINK!

There are many Machine Hazard signs in Stonehouse Catalog No. 8 It's Free on request.

"Signs since 1863"

Stonehouse SIGNS, INC.
MANUFACTURERS

842 LARIMER ST., DENVER 4, COLO.

ACCIDENT PREVENTION SIGNS IN STANDARD COLORS AND DESIGNS

PROTECTION

Visit HY-TEST
Stevens Hotel, Booth 97
National Safety Congress and Exposition
Chicago, October 6-10

WHERE NEEDED

H702—Men's Black Kangaroo Blucher, Leather Sole, half Rubber Heel. **Delivery at once.**

Insure Workers Feet In Sure Protection with HY-TEST Safety Shoes

ANCHOR FLANGE STEEL BOX TOE

This flange adds extra strength to the steel arch's sidewall. Anchored between insole and outsole, it also serves to resist shifting, tilting and cutting through outsole under impact.

Knights of production lines use modern armor — Hy-Test's Anchor-Flange Steel Box Toes. This armor of steel is built into sturdy leathers to ward off blows that injure toes. And Hy-Test Safety Shoes are a pleasure to wear. They have the new Slant-eze tops and many other comfort features. They're all leather in vital parts... strongly built and styled along neat dressy lines. Sizes are 5 to 15 in widths AA to EEE. It's easy for your workers to have them. Let us tell you how.

HY-TEST SAFETY SHOES

HY-TEST Safety Shoes THE WORLD'S LARGEST SELLING SAFETY SHOE

HY-TEST DIVISION • INTERNATIONAL SHOE COMPANY • ST. LOUIS 3, MO. • EASTERN OFFICE • MANCHESTER, N. H.

Comfort

for the worker with

tired feet

No. 1320 Sizes 5 to 12 Widths D and E

The FIRST Safety Shoe with these three Fatigue-Eliminating features:

ARCH SUPPORTING INSOLE!
Sturdy sole leather arch support. It's flexible enough for easy walking, yet firm enough to provide restful comfort for weak or flattened arches.

ORTHOPEDIC HEEL!
Extends forward under arch adding strength and support. Helps to prevent weakened ankles from "rolling inward"...common with pronated arches. Full-height shoe also gives extra ankle support.

SEAMLESS QUARTER!
New, comfort-construction...effectively eliminates heel chafing, prevents leather tearing at back.

In every plant, a certain number of workers continually complain of hurting feet. Many refuse to wear ordinary safety shoes that lack the *extra* arch and ankle support necessary for their comfort. Here, for the first time, is a safety shoe that combines these essential Fatigue-Eliminating aids—Arch Supporting Insole, Orthopedic Heel (ankle and arch support), and Seamless Quarter! It enables you to put 100% of your workers in safety shoes! Typical of Lehigh's unique service supplying industry with special shoes to lick special problems.

LEHIGH
Division of the ENDICOTT JOHNSON CORPORATION
SAFETY SHOE COMPANY
ALLENTOWN, PA.
WESTERN OFFICE: 12th AND SPRUCE, ST. LOUIS 2, MO.

Penalize The Worker?

What do most companies do about the workers who constantly fail to use the safety equipment provided them? If some sort of a penalty is involved, what does the penalty consist of and when is it administered? What is the attitude of the union involved, and how do the workers react to a positive enforcement program?

THESE questions, and many more pertaining to the subject of penalizing workers for failure to use safety equipment are of considerable interest to all persons responsible for plant safety. Technically, this includes management, workers and unions alike, however the safety director is more apt to be concerned than anyone else.

Because this topic has been called to the attention of Occupational Hazards magazine, a questionaire was prepared and sent out to a large number of Occupational Hazards readers. This was done in the hope that the answers returned would prove of interest to all concerned. A breakdown of the answers to the questions sent out have been compiled and appear in the table at the right.

(1) Certainly the number of companies penalizing their workers for failure to wear safety equipment far outweighs those companies who do not.

(2) According to the answers which came in reply to this questionaire, complete support of disciplinary action by unions seem to exceed the number of unions who offer only partial support or no support at all.

(3) A study of the answers given to question three reveals a tendency of management to consider each case on its own merits. For example, in section "C" of question three, 9% of those answering the questionaire dismissed workers on the second offense and 9% on the 4th offense. At the same time it can be seen that the most popular sequence of punishment is:

a—Reprimand for the first offense
b—Layoff on the second offense
c—Dismissal of violators upon their third offense.

Varied Solutions

Many of our readers went into considerable detail when answering this questionaire. These comments were interesting because none of them were alike, even though they all attempted to answer the same problem.

A number of safety directors stated that they enlisted the cooperation of their workers merely by personal contact and by educational means. An equal number stated that they were not satisfied with the results of this method. A large steel company, for instance, stated that they were very much dissatisfied with their present means of encouraging safety practices (this included posters, etc.) and were going to "tighten up" their enforcement policy.

1. Do You Penalize Workers For Failure To Wear or Use Safety Equipment?	
Yes	76%
No	24%
2. Penalty Administered On First Offense Or After That?	
1st offense	5%
2nd offense	86%
3rd or more	9%
3. Extent Of Penalty?	
A—Reprimand	
1st offense	72%
2nd offense	20%
3rd offense	8%
4th offense	0
B—Layoff	
1st offense	0
2nd offense	91%
3rd offense	9%
C—Dismissal	
1st offense	0
2nd offense	9%
3rd offense	82%
4th offense	9%
4. Attitude Taken By Union Concerned?	
Full approval	65%
Partial approval	17%
No support	5%
No answer	13%

On the other hand, a telephone company employing over twenty thousand workers wrote in to say that they had a staff of foremen who worked so closely with the other workers that they have not a single record of a persistent violator.

The safety engineer of a very large rubber company expressed the opinion that punishment should be given "on the spot" at time of violation and in the presence of other workers to get the desired result. A chemical plant stated that they attribute a reduction of 50% in eye accidents directly to their firm disciplinary program.

A plant in Pittsburgh described their method of writing up "reports" on each offense in the presence of both union representatives and the violator. Upon the accumulation of three such "reports" the violator was automatically sent home for a week or so to "study" various safety phamplets supplied by the company. This met with the full support of the union involved.

A Serious Problem

This whole question revolving around the use and wear of safety equipment is a pertinent and serious problem. It is one that can not be solved overnight or solved by wishful thinking. It is a problem that must be brought out into the open and fully discussed. There are some plants who have solved this problem to the satisfaction of all concerned. Perhaps it is impossible to find a solution that will fit every kind of industry in every part of the country, but Occupational Hazards Magazine thinks a lot can be done toward solving this problem if some of the successful programs are brought to the attention of industry.

With this in mind, Occupational Hazards extends an invitation to all of its readers to submit their ideas on this question in the form of a letter of approximately 300 words. The solution which the judges consider most applicable to all industrial plants will be published in this magazine and the writer will be awarded $10.00.

Let's hear from you before Sept. 31—perhaps your solution to this problem will help someone else solve this very difficult problem!

VISUAL EFFICIENCY *on the Nickel Plate*

In line with the modern aggressive railroad policies which are synonymous with the name "Robert R. Young," the Nickel Plate Road's medical department takes advantage of today's scientific equipment to insure that all their employees possess good vision.

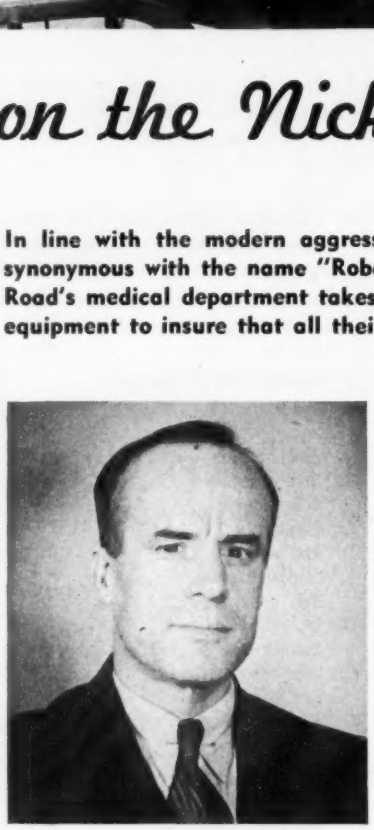
BY DR. JOHN W. HOUK
Medical Director
Nickel Plate Railroad

WE have known for many years that efficient eyesight among our employees is an important factor involving the safe and efficient operation of the railroad.

The engineers who speed passenger and freight trains over long miles of glistening tracks, the men sitting high up in switchyard towers, and the dispatchers sitting before their complex single and double track control boards are all men who hold the responsibility of life and property in their hands. Working quietly and smoothly together, it is they who are putting the magic into the word "railroading."

The Cleveland business man sleeps in his Pullman lower while the train he is on hurtles toward Chicago. Though his eyes are closed, there are many other eyes watching through the night for his safety.

The job of keeping those many eyes alert and keen is an important one. The very fabric and success of railroading depends upon vision and visual skills. Information is acquired, instruction transmitted, schedules maintained, and equipment operated largely through the medium of vision. We know that just as surely as our mechanical equipment wears down if not cared for, so does the eyesight of our employees become worn, impaired or maladjusted if not subject to frequent check-ups. To take the visual ability of our employees for granted would be no more reasonable than to assume that locomotive 1032 will run forever without adequate inspection and upkeep.



Dr. Houk

Old Method Inadequate

At one time, this job of constantly checking on employee's eyesight was a long, tedious affair. Worse, the results often were inadequate or innaccurate. I have in mind the old eye chart which we are all familiar with since childhood days. This method was used to determine visual acuity at various distances. Results were often misleading because of varying lighting conditions, dusty or faded charts. This introduced a strong element of doubt concerning the true visual acuity of the person being tested. It was not uncommon for persons with poor eyesight to memorize the letters on standard charts. Many of them got away with it!

In addition to these adverse factors, there was the time element involved which was in itself very discouraging. Especially so if there were large numbers of persons to be examined. Though all applicants are given eye examinations upon their initial interview as part of regular procedure, the job still remained to re-examine those in service at regular intervals.

New Method

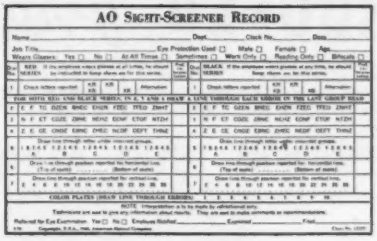
We have recently put into effect a new eye-screening device that has proved to be an admirable solution

to our old problem. This device, which is developed by a leading optical company (there are similar devices on the market), not only accurately and quickly determines employee's visual acuity, but also their simultaneous binocular vision, depth perception and muscle balance. These are all important factors in railroading. Depth perception, for example, is most necessary in order to accurately gauge distances. An extremely awkward and cumbersome device was previously used to determine depth perception.

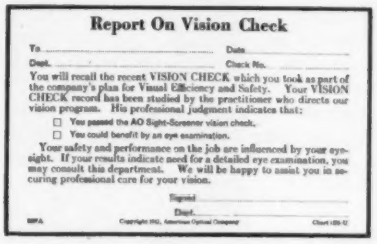
This device we are now using is compact and has been designed for simplicity and ease in operation. Maintenance has been reduced to a minimum. Only three controls are used: one for height, one for headrest adjustment and one for moving the target through fourteen different test positions.

After training one of our nurses in the simple operation of the sight-screener, it was an easy matter to notify outlying stations to prepare employees for the screening operations. In this way, all paper work was done in advance. The cards, samples of which are shown on these pages, were filled in with each employee's name, age, job title and department. After these advance preparations are made, the nurse brings the device to the station and runs all examination in a matter of one, two or three days, depending upon the number of employees stationed there.

In this way we have screened over 800 employees. The results were very gratifying, for, as shown in the chart (below) approximately 16% of these tested were found in serious need of correction. I would imagine that in other industries this figure (16%) would run much higher, but as previously stated, eyesight is watched pretty carefully on the railroads because of its importance.


AO SIGHT-SCREENER RECORD

Professional man in charge of screening analyzes scores made by employees


Report On Vision Check

To ..... Date .....

Dept. ..... Check No. .....

You will recall the recent VISION CHECK which you took as part of the company's plan for Visual Efficiency and Safety. Your VISION CHECK record has been studied by the practitioner who directs our vision program. His professional judgment indicates that:

☐ You passed the AO Sight-Screener vision check.

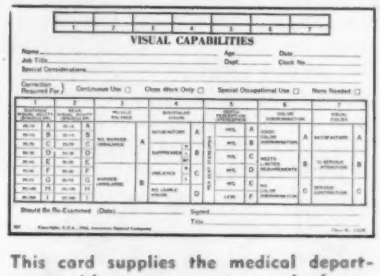
☐ You could benefit by an eye examination.

Your safety and performance on the job are influenced by your eyesight. If your results indicate need for a detailed eye examination, you may consult this department. We will be happy to assist you in securing professional care for your vision.

Signed .....

Dept. .....

Employees discover results of their vision check by this card


VISUAL CAPABILITIES

This card supplies the medical department with a permanent record of employees visual capabilities

Upon initial application all persons found with inadequate vision are not permitted into the service, so those 16% found maladjusted were employees whose vision had become so following their initial entry into service.

In addition to the immediate results of the screening operations, the information on the cards rapidly and economically affords us the visual status of every employee. It provides for referral of visually unadapted employees for standard examination and refraction beside supplying the medical department with a permanent useful record of each employee's visual capabilities.

The employees are exceptionally pleased with the new system. The procedure is explained to them via advance bulletin board messages, etc., and they seem receptive to the idea of discovering their true visual status. Those employees who were found to be needing correction have all obtained necessary treatment so that they were able to pass the screening upon their second attempt.

Job Placement

If it is found impossible to correct an employee's vision to at least 20/30 in both eyes, it is necessary to reassign him to another job less hazardous than the one he previously held. (This refers to those employees on "train service" which includes engineers, firemen, conductors and brakemen.) Employees with "medium" vision can safely be put to work in the machine shops, roundhouses, or in office and clerical positions.

Good Vision—Good Management

The care of employee's vision by management is good sound business practice. Regardless of the industry concerned, that industry will suffer if its employees are making mistakes traceable to poor vision. These mistakes result in damage to goods and property, in addition to endangering life and limb.

This is particularly true in the case of railroading. Our equipment is expensive, our cargo is precious. We at Nickel Plate are gratified that through today's modern scientific devices we are able to keep the vision of our employees to a high level of efficiency, thus reducing the chances of accidents to a minimum.

Location	*Number Screened*	*Number Passed*	*Number Failed*	*Percent Failed*
Bellevue, Ohio	383	323	60	16%
Cleveland Yards	165	145	23	15%
Frankfort, Ind.	256	218	38	15%
Total	802	686	121	16%

PRESS-PROOFED *Prevention*

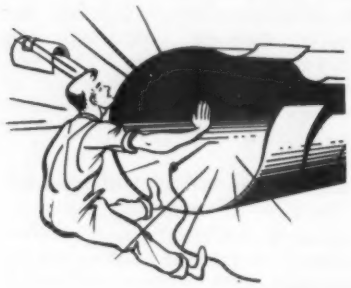
CULLED FROM THE NATION'S PRESS

TOO LATE TO PREVENT THESE ACCIDENTS, BUT—

RESUMES of these industrial accidents were gleaned from actual newspaper reports. Preventive measures and suggested safe practices are recommended here to help you cope with similar mishaps should such situations occur at your plant. Clip and save.

San Pedro, Cal., News-Pilot:

Harry Barber, 48, of Wilmington, was killed instantly when a collec-



tion of gas inside a 3-barrel tank exploded from the flames of a welding torch. The blast was heard three miles away when the steel walls of the tank buckled outward.

Prevention:

Measures should be taken prior to any welding opeartion to see that all known fire and explosion hazards are removed. This is especially true when work is going to be done on any container which has held gases or liquids which give off explosive vapors. Tanks should be flushed out with steam and an air test made to determine whether the gases are gone before welding operations are started.

Peoria, Illinois, Star:

Charles Sullivan, 25, lost the third and fourth fingers of his right hand when it was caught in a punch press at Hart-Carter Co., 100 Eaton Street.

Prevention:

Guards should be installed so that it is impossible for an operator to injure his hand in any way. Though there is no single guard manufactured which will cover every type of operation, there are on the market methods of guarding against hazards of any one type punch press operation. Automatic or semi-automatic feeds should be installed if possible. A good way to spot-light the working area is to paint it in a lighter color than the rest of the press.

Boston, Mass., Globe:

Philip Marcus, 28, resident of Dorchester, was pulling a flat truck containing a load of frozen food at the Snow Coporation warehouse when he fell over backwards into the second floor entrance of an elevator pit. He and the loaded

truck fell 25 feet. The truck narrowly missed him and he miraculously escaped with only a fractured hip.

Prevention:

Safeguards should be taken to insure that entrances to elevator pits are never left open when the elevator is on another floor. A mechanical interlocking device should be installed to make it impossible to leave gates open. Any employee caught propping open elevator gates should be disciplined, as malpractice has caused many accidental deaths.

Greenwich, Conn., Time:

Ronald C. MacDonald, 46, of Rye, lost his right eye while setting stops on a milling machine at the Homelite Corporation plant in East Port Chester. He was using a metal hammer against the metal stop when two tiny metal particles flew into his eye.

Prevention:

Safety glasses! Though plant officials described this sort of accident "so rare they had never heard of a similar case" it should again drive home the rule that safety glasses should always be worn wherever there is the slightest chance of injury to the eye. This is especially so during the operations requiring the striking of metal against metal.

Spokane, Wash., Chronicle:

Clayton Smith, 29, of Evans, an employee of a local company, had an arm torn from his socket when he attempted to oil a conveyor belt

while it was in operation.

Prevention:

No attempt should be made to oil, adjust or otherwise tamper with, any sort of machinery while it is in operation. The hazard of becoming entangled is so great that it warrants the shutting off of power prior to any adjustments being made.

Below: Earl M. Brown, an employee at the Solar Aircraft Company, San Diego plant, here demonstrates how he was seam grinding a storage unit with a portable grinder when the grinding wheel "exploded" and struck his face shield with such force that the shield was knocked off his head. An active member of the plant's Safety Committee, the value of eye protection has always been a serious matter to this employee.

GRINDING WHEEL *Safety*

Eye hazards incident to grinding operations can be reduced if operators wear personal protective equipment and if management provides hoods or other protective devices on every grinding machine.

EYE hazards resulting from grinding operations are threefold: (1) grit and dust from the grinding wheel itself; (2) fine particles from the surface which is being ground; and (3) flying parts from a wheel breaking or "exploding" while revolving at high speeds. The most frequent cause of injury from the operation of abrasive wheels are from the fine particles striking the unprotected eyes of careless workers. Because these particles are white hot, when they strike the eyeball they are likely to burn their way into the delicate tissues, making removal very difficult. To prove this point, examine a pair of safety goggles which have been used for a few months at grinding operations. They will show pitting where abrasive has fused to the lenses. This is an excellent indication of what would happen to the surface of the eyes were eye protection not in use during grinding.

Hoods On Grinding Wheels

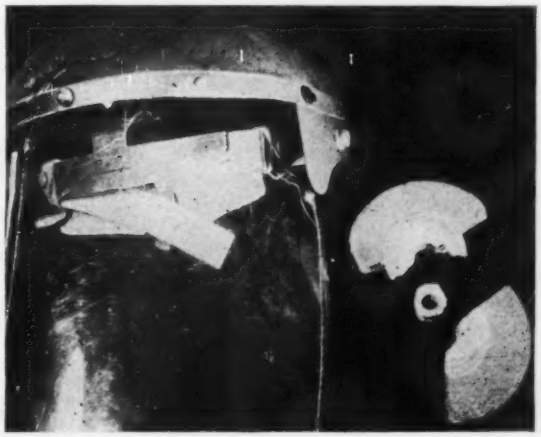
Hoods and other protective devices are what make grinding really safe. If all the safety rules were always followed, breakages would probably never occur and hoods would not be necessary. There is always the chance, however, that someone will some day forget a safety rule and breakage might result.

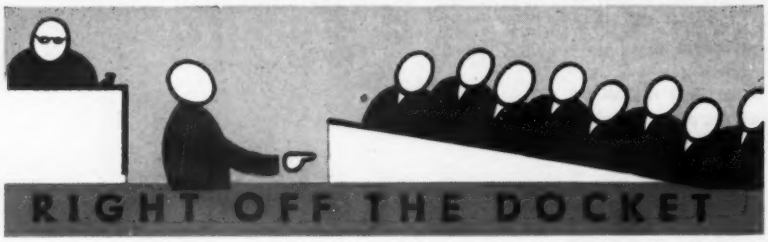
Breakages do not occur often, but because of the high speed at which grinding wheels travel in use, the results are apt to be serious unless proper guards are in use.

(Continued on Page 24)

Right: The face shield Mr. Brown was wearing at the time of accident. Apparently, pieces of the abrasive wheel struck clear portion of shield at eye level, deflected, and hit the upper portion of the frame with sufficient impact to almost sever the head band. To the right is the broken grinding wheel.

(Photos courtesy of Solar Aircraft Co.)





The trend of litigation on workmen's health and accident compensation is reflected in these briefs on the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist. Clip cases and file for future reference.

Employee Killed In Company-Operated Bus

WILLIAM HOWARD SMITH, an employee of Higgins Industries, Inc., was killed in an automobile accident. The mishap occurred

some 40 or 50 miles from the plant while he was riding in a company-operated bus for the purpose of transporting employees between the plant and the various localities in which they lived. He had no other means of going to and from work, and could not have continued in employment of the Higgins Company had the buses not been operated.

Company denied liability contending that the accident cannot be said to have occurred in the course of employment nor to have arisen out of it for the reason that, though the bus on which Smith was riding was owned and operated by the Higgins Company, all of the employees including Smith who made use of it going to and from work, were required to pay regular fares and were, therefore, passengers for hire.

The company in putting the buses into operation concededly did not make itself a common carrier. Thus, it cannot be said that the company was in the business of transporting passengers for hire. It was actuated not by a desire to obtain a return for the operation of the business but by the necessity of obtaining and retaining employees. The buses were operated to tempt workers who might have worked elsewhere, to go to the plant of the Higgins Company instead.

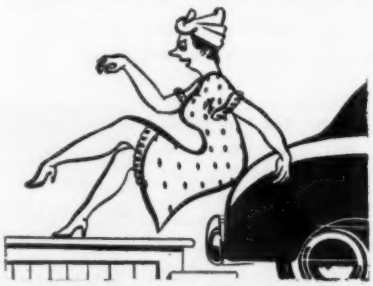
Court therefore, concluded that these buses were operated as "an incident to the employment", and that an accident which occured while an employee was riding in such a bus takes place in the course of employment and arises out of it. So long as the employer did not discontinue the service and so long as the employee continued to ride as an incident to his employment, the legal relationship between the parties while the employee was so riding remained the same. It follows, therefore, that the claim is justified under the compensation statutes.

Neyland vs. Maryland Casualty Co.
Court of Appeals of New Orleans, La.
2-2-46 28 Southern Reporter
2nd Series, pg. 351

Injury During Designated Rest Period

THE claimant worked in a laundry where a 10-minute rest period in the morning and afternoon was allowed employees. They were not paid for the time included in these periods.

While the claimant was standing upon the outside steps conversing with fellow employees during this type of recess, she was struck and



injured by an automobile which was backed up to the steps by another employee, who was acting within the scope of his employment.

The principal contention of the insurer was that the employee at the time of her injury was not under the control or supervision of the employer; that she was not paid for the time spent in the rest periods and that she was not engaged in the performance of her work or anything connected with her work, and, therefore, was not entitled to compensation.

It was concluded that there was a connection between the employment and the injury, if the employment exposed the employee to the risk which caused the injury. Rest periods could be found to be one of the implied terms of the contract of employment or at least to constitute one of the conditions in the plant of the employer. They are not uncommon in factories where women are employed.

An employee is not necessarily barred from compensation because his injury occurred during a rest period for which he was not paid. The fact that the employee was injured while on his employer's premises, before or after his regular hours had begun or ended or during the regular intermission in the day's work, and while he was actually engaged in the performance of the day's duties for which he was hired, does not preclude him from compensation, if at the moment of his injury he was occupying himself in a manner incidental to his employment. Rest and relaxation of the employees at the place upon the employer's premises commonly so used with the knowledge and assent of the latter may be found to be incidental to employment. An award was allowed.

Kubera's case, Supreme Judicial Court of Mass.
Suffolk County, 11-12-46
69 N. E. 2nd Series, pg. 673

Prolonged Exposure to Mercury

JACKSON was employed for six years prior to 1934 in general chemical handling. His health had been good. In 1934 he commenced working with chemical poisons starting in a mill where corrosive sublimate was handled. In this work he was supplied with rubber gloves, a respirator and goggles. The corrosive sublimate was a mixture of mercury and chlorine, and bichloride of mercury which at the time was in a granulated form. It came in heavy corrugated drums from which it was removed with a rubber scoop into the funnel of a shaker. In the ensuing process some of the corrosive sublimate was spilled on the claimant. There was also a very heavy dust present due to poor ventilation and suctions were used to draw up the dust.

(Continued on Page 26)

NOW...Available with Side Shields

Just recently introduced but already a favorite with machine, hand tool and laboratory workers because of their lightweight comfort and protection . . . AO F-9200 Series Ful-Vue Goggles now may be had with acetate side shields for added safety from particles striking from the sides. The shields are perforated to provide ventilation and help keep lenses from fogging.

Ful-Vue benefits provide goggles with vision clarity matched only by the naked eye—lenses conform to and cover eye orbit—hinges and temples are out of line of sight. Nose pads evenly distribute goggle weight and the new keyhole bridge is light and face-formed for comfort. AO Ful-Vue Goggles are available with 6-curve Super Armorplate, clear or Calobar Lenses. Five bridge sizes. Your nearest AO Safety Representative can supply you.

American Optical
COMPANY
Safety Division

SOUTHBRIDGE, MASS. • BRANCHES IN PRINCIPAL CITIES

NEW Ful-Vue Acetate Goggles

HERE'S A *Safer Way*

SAFETY ILLUSTRATED

Number 11

Here are new pictures for your photographic safety manual. Clip and save.

•

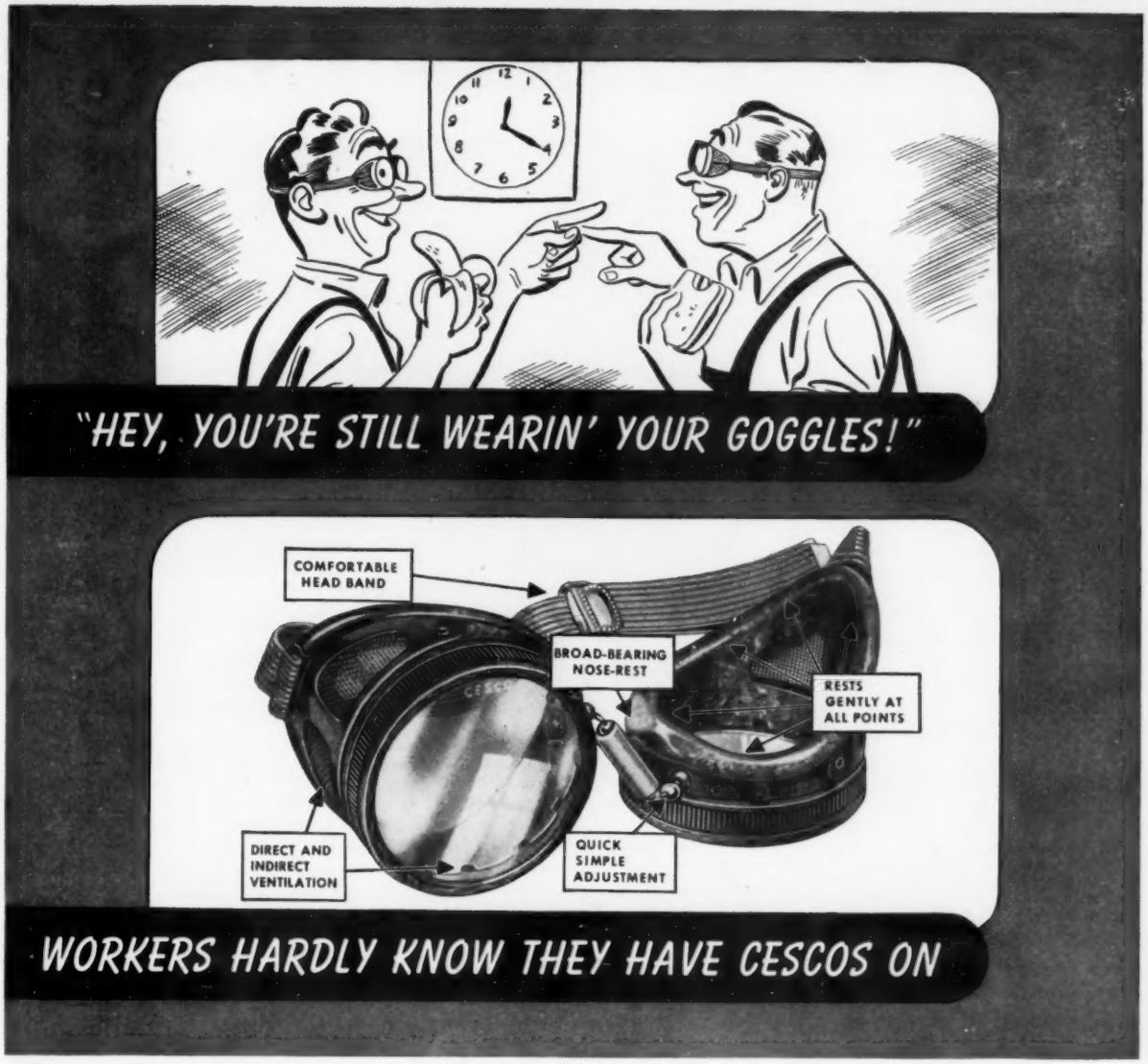
The management of this manufacturing concern believe that one way to keep production and morale on a high level is to make sure that their press operators keep all ten fingers firmly attached to their hands. It's a good idea and they have done a good job of guarding the press as can be seen in the picture.

•

Here's a fellow who is happy about the whole thing. This picture was taken as he was on his way to his plant's goggle repair and service department. He was after a new lens and was tickled pink that he wasn't on his way to the nearest manufacturer of glass eyes!

•

(Leeds & Northrup Co. Photos)


"HEY, YOU'RE STILL WEARIN' YOUR GOGGLES!"
COMFORTABLE HEAD BAND
BROAD-BEARING NOSE-REST
RESTS GENTLY AT ALL POINTS
DIRECT AND INDIRECT VENTILATION
QUICK SIMPLE ADJUSTMENT
WORKERS HARDLY KNOW THEY HAVE CESCOS ON

● Honestly, workers hardly know they're wearing CESCO cup-type goggles. That's because CESCO cup-type goggles are *designed* to be *worn comfortably*. They fit as they should. The cups rest gently at all points—on the eyebrow, nose bridge and cheekbone. No pressing discomfort. No pinching. Broad-bearing nose-rests "float" the cups and add to ease of wearing. Quick, simple bridge adjustment assures comfortable fit on varying facial contours.

● You'll prove these points for yourself after you order CESCO cup-type goggles. Write now.

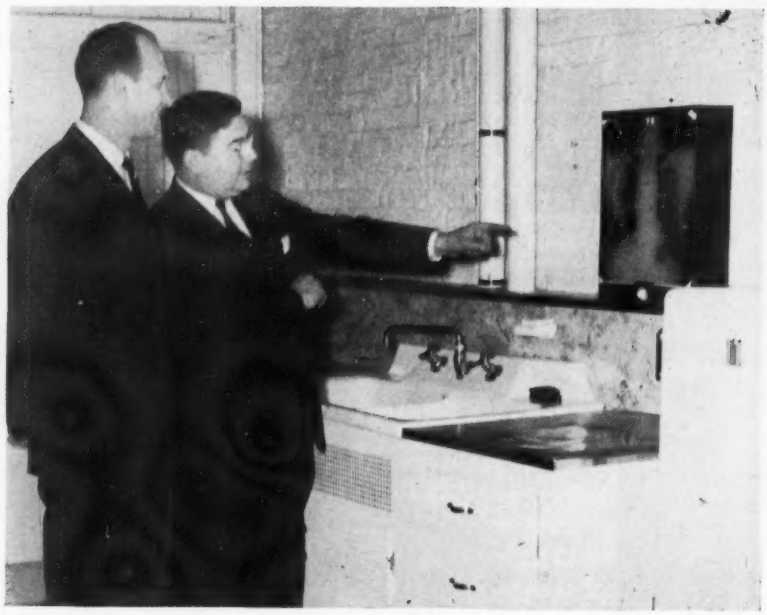
CHICAGO EYE SHIELD COMPANY

2308 Warren Boulevard • Chicago 12, Illinois

CESCO FOR SAFETY

Are Your Workers Threatened by I

BY JACK C. RADCLIFFE, CHIEF
Division of Industrial Health
N. J. State Department of Health



The author is shown the modern equipment of an industrial plant's medical department. Good dispensaries are good employee-health insurance.

Some industrial health hazards are hard to find. Sometimes they are not discovered until a worker turns up in a law court bringing suit against his employer for an occupational disease which the court rules as having "arisen out of and in the course of regular employment." Here is one way to make certain you know about all of the hazards existing in your plant.

THE Industrial Hygiene Plant Surveys which are given to industrial plants through the medium of the Divisions of Industrial Hygiene of the various State Departments of Health consists of a thorough survey of the plant for the sole purpose of uncovering each and every health hazard existing in that plant. The survey is completed with recommendations for either eliminating the hazards or for adequately protecting the workers against those hazards.

An industrial hygiene plant survey covers all phases of a plant's medical program and broadly its environmental control program. In the smaller plants the study is of course limited in scope due to the limitations placed on such plants in the full development of such a program. However, in larger plants the health and hygiene activities which should be recorded and studied cover all phases of public health. This would include water treatment, sewage and waste disposal, plant cafeteria sanitation, washing, toilet and rest room facilities, the medical department policies and procedures, welfare activities and programs affecting the workers, and the control of lighting, noises and specific toxic material exposure. The variation in the subjects indicates the size of the industrial plant survey.

First Phase

The actual industrial hygiene plant survey covers several phases, the most important of which is the first. In this first part the surveyor with the direction and assistance of a plant supervisory employee observes all the plant operations, the materials used and the facilities provided for the protection of the worker's health. Emphasis should be placed on the calibre of person whom the plant delegates to conduct the surveyor through the plant. He should know all the operations well, and what raw materials are being used. In some of the larger plants a person with all this knowledge is rather rare. In these instances the person conducting the surveyor through the plant should know whom to contact for information which he does not have at his fingertips. Actually the accuracy and completeness of any industrial hygiene plant survey depends, firstly, upon the plant employee who conducts the surveyor through the plant.

As a point of information to such parties (usually the safety director), it is always advisable to conduct the surveyor through the plant by starting at the initial operation and ending at the final inspection and packing departments. Digressions can be made occasionally to review sanitary facilities, rest rooms, cafeteria pro-

HIDDEN HAZARDS?

visions or medical department quarters. However, the surveyor will have a clearer picture of the plant's operation and its problems after such a conducted survey.

Second Phase

The accuracy and completeness of an industrial hygiene survey depends, secondly, upon the surveyor. With the expansion of industrial hygiene activities during the most recent war a large number of well qualified industrial hygienists were developed. With this type of personnel available an accurate plant industrial hygiene survey can be conducted in a minimum of time. In most instances the industrial hygienists program is so planned that he knows well in advance just which plants he is going to visit in the near future. With this schedule of activities he can review in the literature the normal processes to be expected in a specific industry, and the common materials in their production. Thus with a better qualified surveyor who has adequate knowledge of typical operations in a specific industry a time-saving and accurate initial survey can be made.

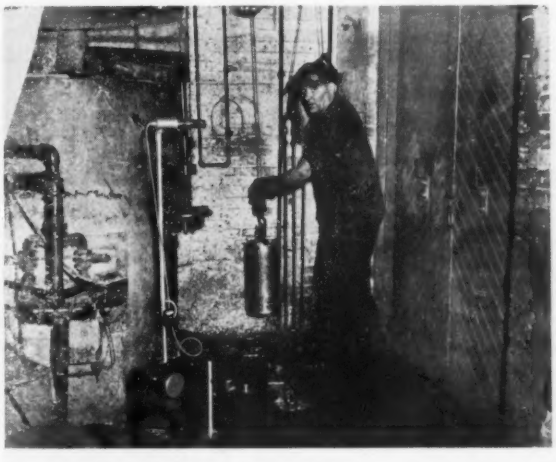
Following the initial survey it is often necessary to revisit the plant to take air samples where toxic or harmful conditions are thought to exist and to measure the control measures in effect over the other known toxic materials. If the initial survey was adequately done, this second visit will give an accurate scientific evaluation of the adequacy of existing control measures and will indicate the needs, if any, of further control of certain operations.

The sampling and testing should always be done so that the results can truly be said to be representative of the employees' exposure. Poor sampling location or duration is no better than no sampling at all. Again, the testing engineer should work closely with the plant supervisory employee so that the results will be truly representative of the workers exposure.

A second type of sampling is often necessary in this second phase of the study to really correctly evaluate an industrial operation or condition. In atmospheric sampling a picture of the conditions to which the worker is exposed is obtained. However, these results do not necessarily mean that the worker has absorbed or been seriously affected by these conditions. Thus it is necessary to examine the individuals at the specific operation to determine this effect. This entails a general physical examination with particular emphasis on diagnostic symptoms indicative of absorption. The correlation of medical examination and atmospheric findings do not always give a conclusive picture. In some instances workers have been found to absorb a specific material yet the engineering findings make this seem impossible. Conversely, engineering findings which indicate a potential trouble spot are not necessarily verified by the physical examination. However, for a complete industrial health picture the medical and engineering results should be integrated before the third part of the survey can be attempted.

Third Phase

The third part of the survey is the recommendatory report with suggestions as to ways and means of controlling the proven exposure. Again cooperation is necessary between all parties involved so that the final recommendations are scientifically correct yet economically feasible. In some instances a certain type of exhaust is indicated, while in others the use of protective creams and garments will do the job at a relatively lower initial cost. The industrial hygiene surveyors are not interested in making the industrialist install expensive control measures. Their recommendations are proven ones which have been used successfully elsewhere. After showing that a potentially toxic condition exists, the surveyor feels that his point has been proven. Management welcomes such evidence so that they can quickly correct existing hazards which threaten the welfare and efficiency of their workers.



An industrial hygienist is here shown sampling lead fumes from a large lead melting pot shown below.

Surveyor taking "on-the-spot" notes while going through plant under inspection. →

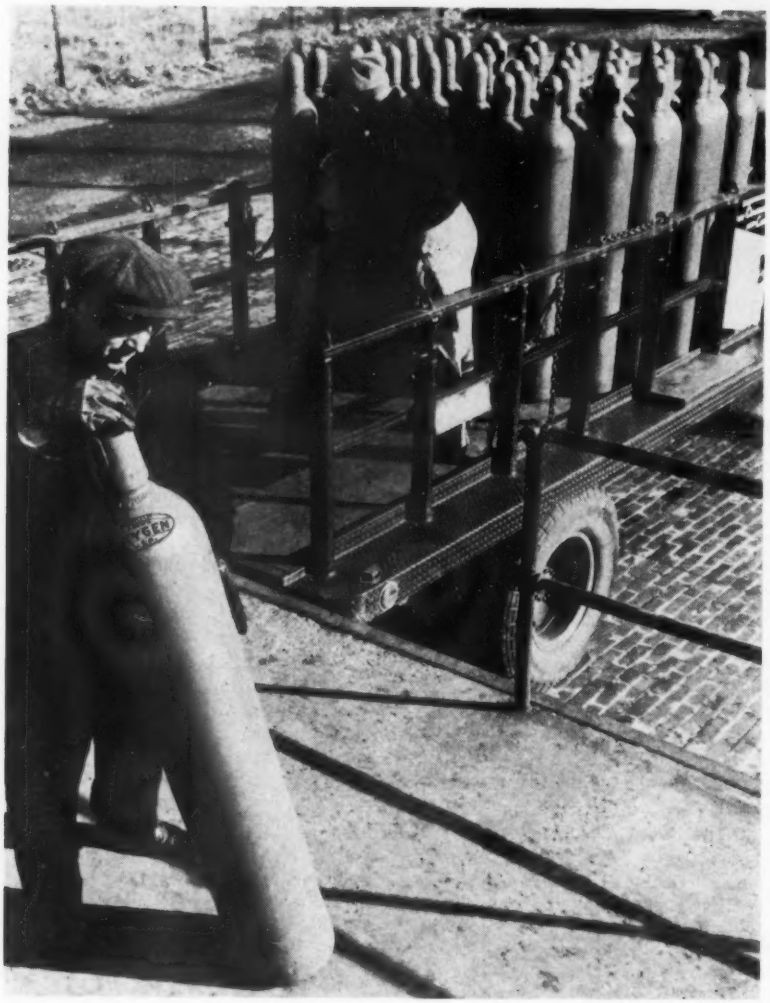


Fig. 1, left—The safe and easy way to move the oxygen cylinder is to tilt and roll it on its bottom edge in a clockwise direction.

Fig. 2, above—This man is taking a second to check a cap before moving the cylinder. That second is a valuable investment in safety.

SAFE HANDLING OF OXYGEN CYLINDERS

Oxygen cylinders are not usually considered as unduly hazardous, and if a few simple, easy to remember, rules are kept in mind and used, the accidents which result from careless handling can be eliminated.

Oxygen cylinders are not ordinarily considered an unusual hazard, but they can be hazardous if they are not properly handled while moving them about. Accident files disclose accidents which in practically every case have been caused entirely through carelessness, thoughtlessness, or ignorance on the part of those responsible.

Accidents rarely occur as long as experienced workmen remain alert. Their entry into accident files are usually made when the experienced workmen disregard safe cylinder handling practices in an effort to "save" a minute. Their efforts have led to broken fingers or crushed toes, necessitating days, weeks or months of lost time and medical attention. It's a poor way to "save" a minute!

There are certain rules which will prevent accidents resulting from careless handling of cylinders if they are strictly and constantly adhered to. They are based upon combined experiences of many men over many years in many industries, and the inexperienced cylinder handler's best protection is to learn and use these rules as promptly and thoroughly as possible so that his job can be made safe. While the few discussed here do not completely cover the subject, they will help the inexperienced operator and serve as a reminder for others to abide by them at all times.

Roll Them—Don't Wrestle

Many inexperienced men attempt to move oxygen cylinders by throwing their arms around them in a violent effort to drag, push and lift them to their new position. A cylinder can be tilted and rolled on its bottom edge with considerable ease. Dragging or sliding is not only bad practice but requires a lot of needless effort as well. When a bear-hug is thrown on a cylinder, the workman has a lot of dead weight on his hands—dead weight which can easily land on his foot should he tire or slip. Once a workman gets the idea of rolling cylinders, he can load, unload and move them about with comparative ease, safety, and speed.

Loose Caps Cause Accidents

Valve-protection caps are designed to protect valves from damage. Carelessness in replacing caps after the cylinders have been used accounts

for the many mishaps to individuals subsequently handling them.

Don't depend on the other fellow. Before moving a cylinder, check to see that the cap is on straight, and try to turn it in a clockwise direction until you are sure that it is hand-tight. Valve-protection caps should never be used for lifting cylinders from one vertical position to another. Roll it clockwise to the position desired. Regardless if the cylinder is empty or full, take that extra second to see that the cylinder valve is closed and the cap is properly in place. That second is a sound investment that can easily prevent an accident.

Keep Them Standing

Transport, store and use cylinders only in an upright position. All necessary precautions should be taken to prevent them from being knocked over or damaged. *If possible, use an approved cylinder truck for cylinders in use.* Otherwise chain them to a column or anchor them to a wall by means of a chain kept in place with lag bolts. If no supporting member is available, set up the cylinders on a level spot and chain or clamp them together. Steadying devices which have been used with considerable success are shown in Figures 3, 4, 5 and 6.

Don't Tamper With Cylinders

If cylinder valves cannot be opened by hand or if a cylinder is received in a damaged condition, *set it to one side.* Make no attempt to use a hammer or wrench or any other tool in order to repair or otherwise tamper with a cylinder. Report the trouble to the supplier, giving the serial number stamped on the cylinder, and follow his instructions as to its prompt return. Never use cylinders as rollers or supports even if they are considered to be empty.

"Air" vs. "Oxygen"

Oxygen should never be called "air." Always call oxygen by its proper name—"oxygen." Once this habit is acquired, the serious mistake of using oxygen as compressed air will be avoided. Never attempt to use oxygen in pneumatic tools, in oil preheating burners, to start combustion engines, to blow out pipelines, to "dust" clothing or work, to create pressure, or for ventilation. Many serious accidents on record are the result of using oxygen for the above mentioned uses. Though oxygen itself will not burn, it supports and accelerates combustion, and will cause oil and other combustible materials to burn with great intensity.

Oil and Oxygen Don't Mix

Do not handle oxygen cylinders with oily hands or gloves. Although the chances of cylinder slippage in greasy hands is high, more important still is the fact that oil or grease may ignite violently if subjected to oxygen under pressure. Keep oily or greasy substances away—do not handle oxygen cylinders on the same platform with oil, and never place them in a position where oil or grease is likely to fall upon them from overhead cranes or belts.

Use a Cylinder Truck

If oxygen cylinders must be transported over any considerable distance, it is best from a safety and convenience standpoint to use an approved cylinder truck complete with a chain or steadying device that will prevent them from being knocked over. These trucks can be purchased, but if they are not available, satisfactory devices can be made from scrap material. The use of cylinder trucks or other device goes a long way in promoting safety and cutting down work involved while moving cylinders.

Fig. 3, below—This simple system is used by experienced operators to steady oxygen and acetylene cylinders if there is no stationary object to which cylinders can be anchored.

Fig. 4 below, left—This is one way to prevent upsets if an approved cylinder truck is not available. A hook over the top edge of the acetylene cylinder keeps chain from slipping down.

Fig. 5 below, center—This stand welded from an old wheel rim, cross-braced with strap iron, is one way to provide a stable base for single cylinders. This is especially good for rough flooring.

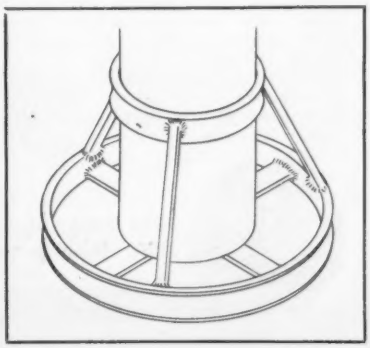
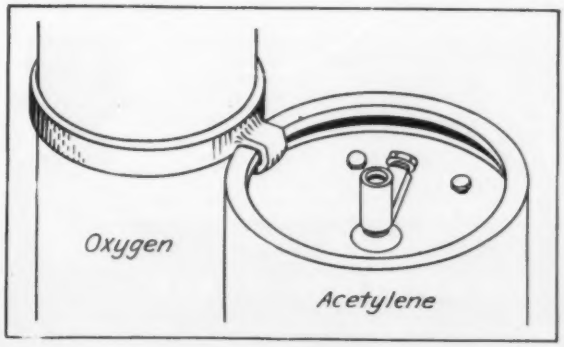


Fig. 6 below, right—A strap iron ring with a lug welded to one side makes a good clamp for use in close quarters.

(Photos and Drawings: courtesy of Linde Air Products Co.)



Grinding Safety

(Continued from Page 15)

It is always expected that the wheels will not break, and if it has been properly handled and mounted and is not in any way abused it will not, but the guard should always be in place—the worker should always be wearing protective equipment—just in case . . .

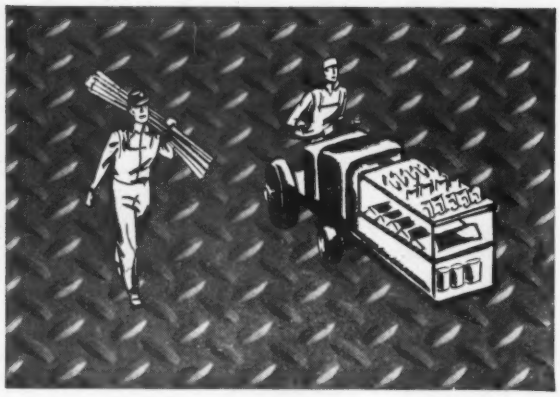
Danger of Wheels "Exploding"

To guard against breaking or "exploding" abrasive wheels, the following should be exercised: (1) inspection of wheel for imperfections; (2) proper wheel speed; and (3) correct mounting on grinder.

The proper wheel speed is very important, and great caution should be exercised by all employees using grinders, particularly portable grinders, to assure themselves that the maximum operating speed of the abrasive wheel is not violated. Foremen should designate the type abrasive wheel the worker is to use on a specific job. As a check, the tag or blotter on the wheel shows the highest speed which the wheel manufacturer recommends. If the machine speed is faster than the speed stamped on the wheel, then that wheel should be changed.

This table indicates maximum speeds for various types and grades of wheels. These speeds should be exceeded only with the permission of the manufacturer.

Types of Wheels	Vitrified and Silicate Bonds			Organic Bonds		
	Soft	Med.	Hard	Soft	Med.	Hard
Type 1—Straight Wheels...	F.P.M.	F.P.M.	F.P.M.	F.P.M.	F.P.M.	F.P.M.
Type 4—Taper Wheels	5,500	6,000	6,500	6,500	8,000	9,500
Types 5 and 7—Recessed Wheels	5,500	6,000	6,500	6,500	8,000	9,500
Type 2—Cylinder Wheels..	4,500	5,500	6,000	6,000	8,000	9,500
Dovetail Wheels ..... Types 11 & 12—Dish & Flaring Cup Wheels..... Type 13—Saucer Wheels...	4,500	5,500	5,500	6,000	7,500	9,000
Type G—Deep Recessed Cup Wheels	4,500	5,000	5,500	6,000	7,500	9,000
Cutting-off Wheels Larger than 16" dia.						75,000 to 14,000
Cutting-off Wheels 16" and Smaller						10,000 to 16,000



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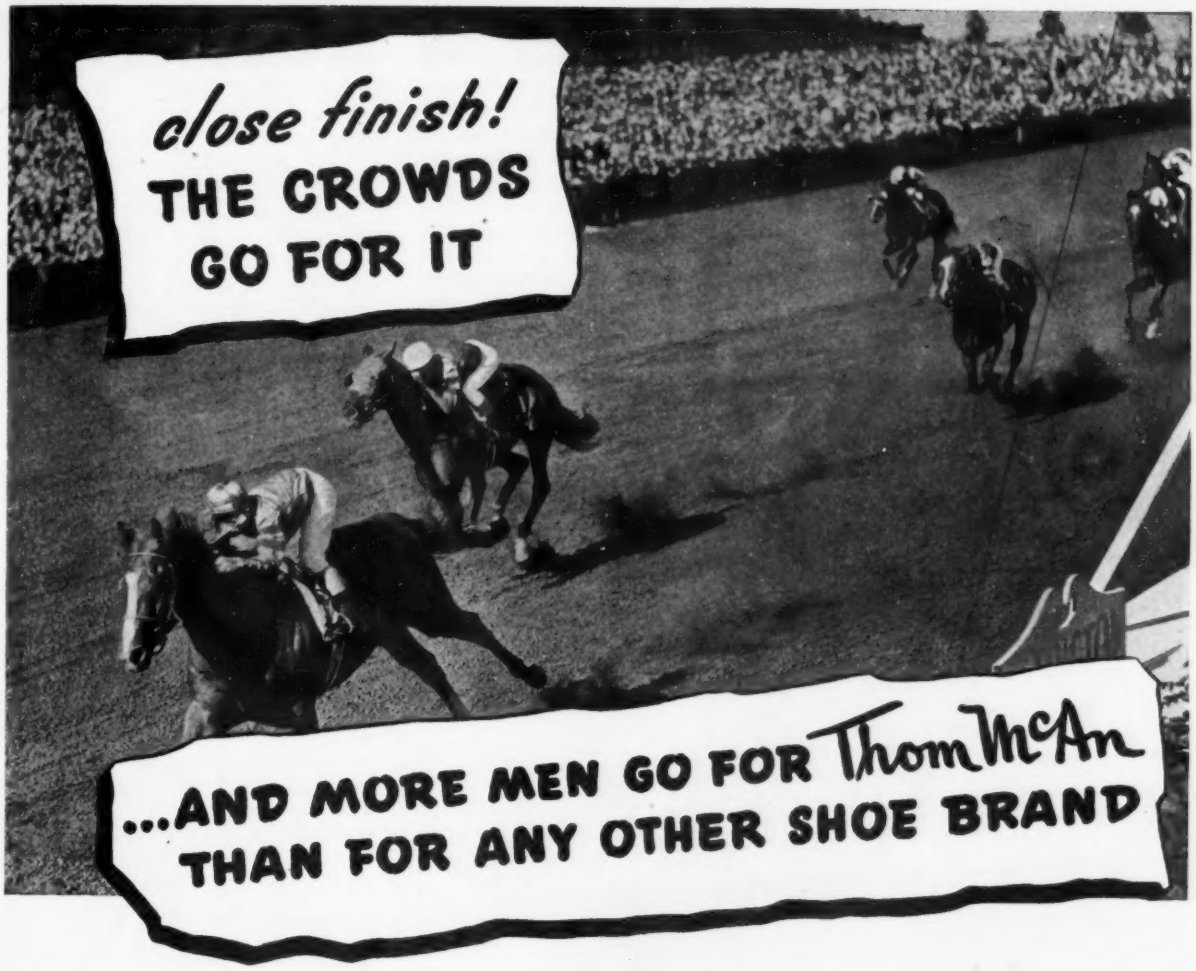

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Make this store your Safety Shoe Dept.

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OFF DOCKET—from page 16

Jackson performed this process every work day. The dust got on his body and infiltrated into his eyes, nose and mouth, irritating those parts. It got into his clothes and on his hands and neck so that he could peel his skin off.

In 1936, he went off his job into another part of the building as an operator making corrosive sublimate until he was disabled in February, 1943. As an operator, he used personal protective equipment. His work necessitated cleaning out the pipes which would become clogged and in doing so he would come in contact with the corrosive sublimate. During all of this process he was exposed to mercury dust or mercury fumes. He would get splatterings thereon in his clothes and around his face and smell the fumes all day long.

He first noticed his illness in September, 1942, when his eyes became crossed. Shortly thereafter, he experienced weakness in his ankles, knees, back and fingers. The company contended that the claimant was suffering from myasthenia gravis, the origin unknown, and not from exposure to mercury. Myasthenia gravis is a specific disorder characterized by muscle weakness and occurs commonly in females

rather than males. There was contradictory testimony in regard to the presence of mercury. However, the Court concluded from the record that the claimant had gradually established a case and that compensation should be assessed as a result of having contracted a compensable occupational disease and mercurial poisoning due to exposure to a mercury compound.

Jackson vs. Mallinkrodt Chemical Works, New Jersey, 10-20-46
50 Atlantic Reporter, 2nd Series.

Employee Engaged In Personal Quarrel

MONTE was a helper at the time of his injuries, acting under the orders of one Burfield. At Burfields' direction, they both went to the aid of another workman, Spinola, with whom Monte had had no previous personal relations of any moment. Spinola was working on an acetylene gas tank with a wrench, which did not suffice, so Burfield told Monte to go get another wrench.

Apparently Monte took his time about doing so, for he admits that Spinola called to him once, or perhaps twice, "If you are going to get it, get going."

To this Monte replied, "Who made you my boss?" adding some unpleasant epithets.

Thereupon, Burfield, the foreman, seeing that Monte, instead of going to get the wrench, as ordered, was engaging in a verbal dispute with Spinola, went to get the wrench himself.

When he returned he found Monte lying on the floor, with a bloody face. What happened, is naturally somewhat in dispute. Monte says,

What's *your* safety problem? If "your slips are showing" the answer is Gro-Cord's NEO-CORD soles and heels on safety shoes. Cords for non-slip safety, genuine duPont Neoprene for longer wear under the most damaging conditions. Say it for safety, say it for economical longer wear — "NEO-CORD." Genuine Neo-Cord soles and heels are manufactured only by Gro-Cord Rubber Company, Lima, Ohio.

that after he asked Spinola who made him his boss, Spinola came out of the cage, in which he had been working, toward Monte, with a wrench "telling me what I was supposed to do, and started to use abusive language," thereafter striking him in the face and knocking him to the ground.

During this time Monte claims that he was merely "pulling up the zipper on my lumber jacket" and neither attempted to strike Spinola nor called the latter names. Spinola, on the other hand states that not only did Monte call him names, but that "he also said he was going to take care of me, and he came towards me as if he were going to hit me," with further epithets.

In any event it is clear that both Monte and Spinola stopped the work they were directed to do, Monte to

get the wrench, Spinola to shut off the tank, in order to engage in personal quarrel.

Clearly this accident of Monte's was not in the furtherance of his employment nor reasonably necessitated by his employment as incidental thereto but was on the other hand a matter of concern purely personal to Monte. In one sense this personal quarrel arose out of the employment, in that the employment gave rise to the situation which aroused the presonal ill feelings between the two.

However, it was not his employment which inflamed Spinola into striking Monte, but his uncalled-for attitude and failure to do the work directed which angered Spinola and caused the blow. Monte was not attending to business when attacked nor compelled to defend himself from such attack at the time when attending to his business. Recovery denied.

Monte vs. Gen. Motors Corp.
Court of Common Pleas New Jersey.
Essex County. 11-18-46.
49 At. Rep. 2nd series, page 501.

Exposure to Rain Results in Operation

BAYER was engaged as a "chipper" in which he used an air hammer and chisel to chip off metal lugs while working on a new boat being constructed on the docks of the American Ship Building Company, Cleveland, Ohio. This was done in the open air. On the morning of February 16, 1942, claimant checked in at 7:58 A.M. During the course of the morning a "hard rain and very cold" fell upon the dock.

It was necessary for the claimant to lie down on a piece of iron while doing his work, and while so doing he became "wringing wet plumb through." Because of the weather, he began to ache all over and finally went home at 3:34 P.M. He went to bed and sent for a doctor who prescribed some medicine and instructed him to stay in bed. He returned to work the next morning, but feeling badly, returned home and to bed. He was away from work from February 17 to March 2, 1942, on which date he returned to work and worked regularly until March 18, 1942. Thereafter he was absent

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Dixie Tubular Dust Collectors are simple in design . . . sturdily built . . .positive in action . . . gives smooth, non-vibrating operation. Here's how Dixie Safeguards Employees automatically . . . completely . . .

1. Dust-laden air enters below bottom plate
2. Dust settles in hopper
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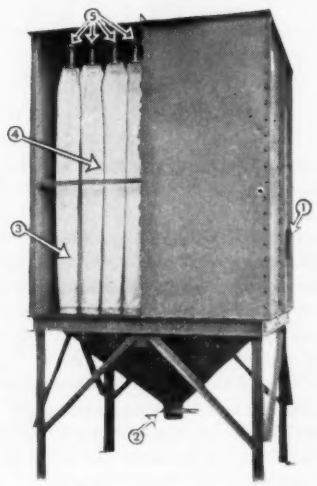
4. Filtered air passes through porous walls
5. Dust forced into hopper by Dixie "Snap Action"



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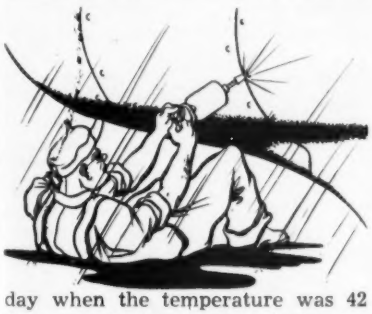
from time to time until he was taken to the hospital on April 20, 1942. At this time the physician in charge made a diagnosis of "pleurisy with possible pneumonia" contracted because of "exposure and cold." Subsequently it was necessary to perform an operation which necessitated the removal of several ribs from the claimant's back in order to operate on his lungs and to remove an abscess that had formed there.

Attending physician stated that in his opinion there was a casual relationship between the manner and conditions under which the employee was required to work and that his condition was due to exposure.

Court concluded that the statutes comprehend a physical or traumatic damage or harm, accidental in its origin and character in the sense of being the result of a sudden mishap occurring by chance, unexpectedly and not in the usual course of events. However, the Workman's Compensation Act was not enacted as a general health and insurance policy. There is a line of demarcation between cases where there is merely a health hazard and cases where there is a physical or traumatic injury, accidental in origin and character in the sense of being a sudden mishap occuring by chance and not in the usual course of events.

In the instant case the court found neither physical or traumatic damage or harm accidental in origin and character, and therefore viewed as not being such as entitled the employee to participate in the Workman's Compensation Law.

Therefore, a person who was required to work outside in rain on a

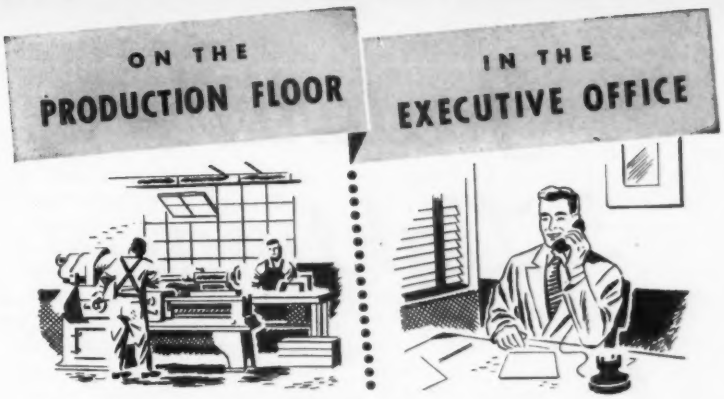


day when the temperature was 42 degree and who contracted pleurisy with possible pneumonia and who subsequently suffered a lung abscess requiring an operation could not recover compensation.

Bayer vs. American Ship Building Company

Court of Appeals of Ohio, Cuyahoga County, 11-4-46

72 N. E. Reporter, Second Series, Page 394



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Tailored Lighting

. . . Part II

(Material for Part II was taken from a paper prepared by W. Sturrock and J. C. Forbes, engineer specialists of the Lamp Department at General Electric Company)

When consideration is given to the lighting systems for a new plant or to replacing obsolete systems, one of the most pertinent questions asked is, "How much do they cost?"

THIS is a timely question because there is quite a spread between the comparatively low cost of filament luminaries and the high cost of mercury and fluorescent luminaires, all of which are suitable under some conditions for industrial operations. Moreover, the answer to the question is too often given in terms of the labor and materials necessary to make the initial installations with little or no concern about the economics of amortization of capital investment or to operating and maintenance costs. Amortization and operating costs should be considered in computing the "over-all" cost of a system.

In order to show how these items effect the economics of lighting, a detail cost analysis is given on these pages for 8 different designs of industrial lighting systems. It should, of course, be understood that all systems being compared must be capable of providing an acceptable quality of lighting which is a fundamental criterion for all good lighting systems regardless of how many foot-candles are available. The selection of a satisfactory lighting system must include consideration of harsh shadows, holding contrast within comfortable limits and in some cases the use of a particular color quality which, for example, may be required for the proper inspection of certain products. Assuming that all these important quality considerations have been properly handled by the plant owner or other competent person, with specifications as to the lighting equipment and method of installation, it then becomes possible to compute, analyze and summarize "over-all costs." To simplify this analysis as much as possible, it is assumed that the lighting systems can all readily be connected to existing wiring systems.

Cost Analysis

To explain the development of the table, a short step-by-step analysis will be given for a typical 40-watt fluorescent system. The luminaire under consideration consists of a channel eight feet long which houses the ballasts and wires and supports the sockets and reflectors for the four 40-watt fluorescent lamps; two individual open-end industrial type reflectors being used with two lamps in each. An estimated purchaser's net price (less lamps) for this 2-reflector 8-foot unit is $30.00 and it is further

TABLE I

COST ANALYSIS OF 8 INDUSTRIAL LIGHTING SYSTEMS

		FLUORESCENT						
		PREHEAT-START 40-WATT 8-ft. section, open-end industrial-type unit four 40-watt lamps, 118 volts 60 cycle		INSTANT START 40-WATT 8-ft. section, open-end industrial-type unit four 40-watt lamps, 118 volts 60 cycle		PREHEAT-START 100-WATT SMA 10-ft. section, open-end indus ind trial-type unit four 100-watt lamps. 118 volts 60 cycle		
1.	Rated lamp lumens per luminaire	9200 (8400)		9200 (8400)		16,800 (16,000)		
2.	Watts per luminaire	191		216		464		
	INITIAL COST PER LUMINAIRE INSTALLED (Estimated) (Not including wiring system)							
3.	Purchaser's net price (less lamps)	$30.00		$30.00		$35.00		
4.	Installation cost	12.50		12.50		14.00		
5.	Lamps—net (30% discount)	2.80		3.40		6.45		
6.	Total	$45.30		$50.90		$75.45		
	ANNUAL OPERATING COST PER LUMINAIRE	*1-shift*	*2-shift*	*1-shift*	*2-shift*	*1-shift*	*2-shift*	*1-sh*
	Energy at 1c per KWH:							
7.	1-shift 2500 hrs. per year	$ 4.80		$ 5.40		$11.60		$ 6.
8.	2-shift 4000 hrs. per year		$ 7.60		$ 8.60		$18.60	
	Lamps:							
9.	Hours life	2500	4000	2500	4000	3000	4500	25
10.	Number of lamps replaced per year	4	4	4	4	3.3	3.6	
11.	Annual cost of lamps	$ 2.80	$ 2.80	$ 3.40	$ 3.40	$ 5.30	$ 4.80	$ 7.
12.	Labor for replacing lamps	.80	.80	.40	.40	.60	.70	
13.	Total lamp cost	$ 3.60	$ 3.60	$ 3.80	$ 3.80	$ 5.90	$ 6.50	$ 8.
	Cleaning:							
14.	Cleaning luminaire—twice a year	$ 1.20	$ 1.20	$ 1.20	$ 1.20	$ 1.50	$ 1.50	$ 1.
15.	Total operating cost (Energy plus Lamps plus Cleaning)	$ 9.60	$12.40	$10.40	$13.60	$19.00	$26.60	$15.
16.	Annual owning cost per luminaire (16⅔ per cent of items 3 and 4)	$ 7.10	$ 7.10	$ 7.90	$ 7.90	$11.50	$11.50	$ 9.
17.	TOTAL ANNUAL COST PER LUMINAIRE (Item 15 plus 16)	$16.70	$19.50	$18.30	$21.50	$30.50	$38.10	$25.
	ANNUAL ILLUMINATION COST—Assuming typical large area of which 8000 sq. ft. is provided with 50 foot-candles maintained in service.							
18.	Coefficient of Utilization (A—50%-30%)	.69	.69	.69	.69	.65	.65	.6
19.	Maintenance factor	.65	.60	.65	.60	.65	.60	.6
20.	Number of luminaires	100	108	100	108	58	63	7
21.	TOTAL COST FOR ASSUMED AREA	$1670	$2110	$1830	$2320	$1770	$2400	$193
		100%	100%	110%	110%	106%	114%	115%

estimated that it will cost $12.50 to have it unpacked, installed in the room and wired to an existing distribution system. The four 40-watt lamps at a 30 per cent discount cost $2.80. The sum of these three items gives an initial cost per luminaire and its installation of $45.30. This is shown in the first column, item No. 6, of the table.

If this 191-watt unit is used in a plant working on a one-shift 8-hour basis, it is estimated that it would be turned on for about 2500 hours in a year's time so that the annual energy cost, assuming a one-cent rate, would be $4.80. This is the first item in the development of the operating cost of which other items are lamps and cost of cleaning.

Operating experiences indicate that the life of fluorescent lamps depends to a considerable extent upon the number of burning hours per start. The longer the lamps are burned for each time turned on, the longer the over-all life will be and, therefore, industrial plants having a two-shift work schedule will get a longer over-all average lamp life than will plants having the one-shift schedule. It is estimated, however, that the over-all average life of the fluorescent lamp in an industrial plant is one year. Items 8 and 9 in the table therefore indicate that the lamps will have to be replaced once a year. The cost of the four lamps is $2.80 to which is added $0.20 per lamp for replacement labor, making an annual lamp cost per luminaire of $3.60. If it costs $0.60 to clean the two-reflector unit, it will cost $1.20 to clean it twice a year.

Item 15 shows that the total annual cost of operating this particular luminaire is the sum of the costs for electrical energy, lamp replacements and cleaning which amount to $9.60 under one-shift operation and $12.40 under two-shift operation.

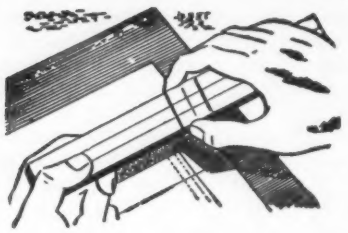
Amortization Charges

It should be emphasized that this total annual operating cost does not include any amortization charges for the investment required in purchasing and installing the equipment. A reasonable per cent of this investment which in this case amounts to $32.50 should be charged off each year in order to get a true estimate of the annual owning and operating costs. A figure of 16⅔ per cent of the purchaser's net price for the fixture plus the installation cost is believed by the authors to be a fair charge-off and therefore has been used in this analysis. It amounts to $7.50. When this is added to the cost of operation it gives a total annual cost per luminaire of $16.70 for one-shift operation or $19.50 under two-shift operation.

Continuing the analysis to develop the comparative annual owning and operating cost of several complete lighting systems, it is only necessary to establish the relative number of luminaires to be used in each of them in order to produce equal footcandles. It is therefore assumed that each lighting system is installed in an 8000 sq. ft. section of a large industrial area, where the various types of equipment can be installed at the proper height to justify a Room Index of "A" and that the ceilings and walls have 50% and 30% reflection factors respectively. Under these conditions 100 of the 8-foot 40-watt units for one-shift operation will provide 50 footcandles in service and its estimated over-all annual cost is 100 x $16.70 or $1670. For the two-shift operation 108 units are found to be necessary because the average lumen output of fluorescent lamps having a life of 4000 hours is less than it is for lamps which fail at about 2500 hours of operation. In the case of the two-shift operation the estimated over-all cost is 108 x $19.50 or $2110.

The cost of proper industrial lighting is usually a small portion of the total cost of a manufacturing plant. Nevertheless, it economically justifies a high factor of importance when evaluated on a basis of its contribution to effectiveness of plant operation. Lighting as an environmental factor, lighting as a production tool, and lighting as a safety factor can all be recognized as contributors to safe and easy seeing conditions—under which work can be accomplished in a most satisfactory manner.

		MERCURY				COMBINED MERCURY AND INCANDESCENT		INCANDESCENT	
TART 100-WA[T], open-end indu[st]. it four 100-w[att] 8 volts 60 cycle	SMALLER DIAMETER industrial-type unit, four in. 51-watt lamps, 200 ma., 118 volts 60 cycle	Two 400-watt mercury lamps, two-lamp ballast, 230 volts, 60 cycle, twin porcelain enamel wide distribution reflectors		One 3000-watt mercury lamp, 460-volt, 60 cycle ballast, porcelain enameled reflector		Two 400-watt mercury lamps, one 1000-watt incandescent lamp, porcelain enameled reflectors, 120 volts, 60 cycle		One 1000-watt incandescent lamp, porcelain enameled reflector, 120 volts	
0 (16,000) 464	12,800 (12,200) 260		32,000 870		120,000 3190		26,750 940		21,500 1000
$35.00 14.00 6.45	$44.00 12.50 7.60		$36.00 20.00 14.70		$120.00 30.00 30.80		$21.00 15.00 8.60		$ 6.50 10.00 2.45
$75.45	$64.10		$70.70		$180.80		$44.60		$18.95
2-shift	*1-shift*	*2-shift*	*1-shift*	*2-shift*	*1-shift*	*2-shift*	*1-shift*	*2-shift*	*1-shift*	*2-shift*
$18.60	$ 6.50	$10.40	$21.70	$34.80	$ 79.70	$127.60	$23.50	$37.60	$25.00	$40.00
4500	2500	4000	4000	6000	3000	3000	4000/1000	6000/1000	1000	1000
3.6	4	4	1.25	1.25	.83	1.33	63/1.25	.63/2.0	2.5	4.0
$ 4.80	$ 7.60	$ 7.60	$ 9.20	$ 9.20	$ 25.60	$ 41.00	$ 7.70	$ 9.50	$ 6.15	$ 9.80
.70	.40	.40	.30	.30	.80	1.30	.40	.60	.60	1.00
$ 6.50	$ 8.00	$ 8.00	$ 9.50	$ 9.50	$ 26.40	$ 42.30	$ 8.10	$10.10	$ 6.75	$10.80
$ 1.50	$ 1.20	$ 1.20	$ 0.80	$ 0.80	$ 2.00	$ 2.00	$ 0.55	$ 0.55	$ 0.30	$ 0.30
$26.60	$15.70	$19.60	$32.00	$45.10	$108.10	$171.90	$32.15	$48.25	$32.05	$51.10
$11.50	$ 9.40	$ 9.40	$ 9.30	$ 9.30	$ 25.00	$ 25.00	$ 6.00	$ 6.00	$ 2.80	$ 2.80
$38.10	$25.10	$29.00	$41.30	$54.40	$133.10	$196.90	$38.15	$45.25	$34.85	$53.90
.65	65	.65	.65	.65	.69	.69	.65	.65	.65	.65
.60	.65	.60	.70	.65	.70	.70	.70	.65	.65	.65
63	77	83	28	31	7	7	34	37	46	46
$2400 114%	$1930 115%	$2410 114%	$1160 69%	$1670 79%	$930 57%	$1380 65%	$1300 78%	$2010 95%	$1600 96%	$2480 118%



New PRODUCTS

For further information on any of these products, simply list the key number at the foot of each item on the special post card enclosed with this issue.

PORTABLE WATER CARRIER— To satisfy the demand for an efficient and sanitary method of providing drinking water to working men on jobs where water is not readily available, the Dixie Cup Company have designed the new Dixie Water Carrier. Made of stainless steel, it

is well insulated to keep water cool for many hours. Each drink is served in an individual Vortex Paper Cup, which is claimed by the manufacturer to eliminate the chance of mouth-borne infection and drastically cuts down on man-hours previously lost due to the common cold, flu, etc.

NP 151

SAFETY GOGGLES—A new rubber-framed safety goggle, specially designed for work in hot and humid atmospheres where chemical and dust hazards exist, has been announced by the American Optical

Company. Feature of the 705 supervent goggle is an ingenious nosepiece with an inhalation and exhalation valve to prevent fogging and steaming of the goggle's large acetate single lens. This feature prevents the lens from fogging. Recommended by manufacturer for wear on jobs requiring the handling of acids and caustics. Protects against chemical splashes, spray and impact of foreign particles and exposures to fine dust concentrations. Exceptional wide-angle vision.

NP 152

NON - SKID MAT — A new and unique rubber mat for added safety and elimination of fatigue in the

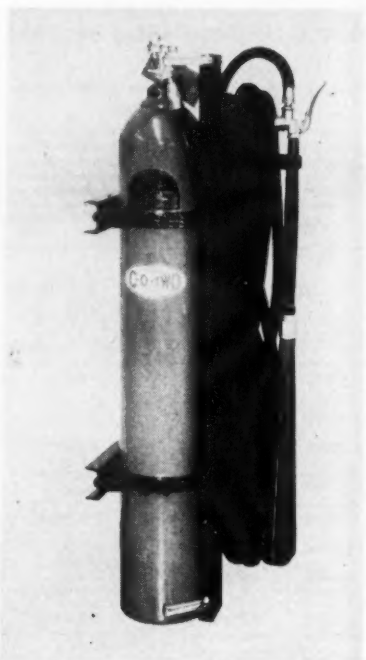
plant has been recently introduced to the market by the Avenue Manufacturing and Sales Company of Chicago. Consisting of over 2,000 ¼" high rubber cones which cushion the feet, this black, "Magic Mat" is 21¼" square. Its overal thickness is $\frac{11}{16}$" with a center layer thickness of $\frac{3}{16}$". The cones are built into both sides for longer life and elevation from damp floors to prevent electrical ground shocks.

NP 153

FUME CONTROL— The Industrial Electroplating Company, manufacturers of KLEENAIRE Fume Separating Systems, have recently developed for industry a new unit for fume control which is claimed by the manufacturers to effectively separate fumes from contaminated air, returning the cleaned air to the room. Installation is easy and quickly accomplished. The unit requires only a source of water, a drain and an electrical connection.

NP 154

HOSE RACK—The C-O-TWO Fire Equipment Company has announced a new type of carbon dioxide hose rack for fire fighting. Originally designed for use on diesel electric loco-



motives, this hose unit is especially recommended for those industrial fire hazards which are not large

(Continued on Page 35)

gases and solvent vapors present with the metal dusts or fumes.

harmful properties if present in the body in abnormal amounts. Physiologically, the normal person possesses and needs some quantity of many of the known

TECHNICAL FILE ON METAL POISONING

SAVE THIS VALUABLE REFERENCE MATERIAL: BUILD UP A PERMANENT OFFICE FILE

C101. CAUSE OF METAL POISONING. Metal posioning in industry usually results from the absorption of small doses of toxic metal dusts or other toxic substances over a period of days, weeks, months or even years. Though these small doses do not produce any immediate signs of injury, they do accumulate in the body until the total amount of dust absorbed is too great for the body to eliminate. This results in a poisoned condition.

C102. EFFECT OF POISONS. Dr. John M. McDonald, Director of the Baltimore (Md.) Bureau of Occupational Diseases, has pictured the effect of poisons on the body from the standpoint of a traffic engineer. A "through" street would be the digestive system—mouth, gullet, stomach and bowels. When only a small dose of poison is swallowed, there is every chance that the body will not absorb this poison into the blood streams. The dose generally will pass right through the digestive system and out in the bowel elimination. Should some of the poison get into the blood stream by absorption from the bowel, that blood has to flow immediately through the liver. There is no by-pass. The liver might be called a "traffic officer" for it has the power to neutralize poisons (dangerous drivers) and to void them by way of the bile. Thus, the digestive system resembles a through street protected by a traffic officer. On the other hand, the respiratory system of nose, throat, windpipe and lungs is considered a blind alley or "dead end street."

C103. DANGER OF INHALATION. Any dust, fume or vapor that is breathed into the lungs can escape only by returning the way it entered. Though some portion of inhaled substance may lodge at the back of the throat and be swallowed, unfortunately a large portion may remain in the lung. This is in spite of any coughing or sneezing. Once in the lung, the poison is absorbed directly into the blood stream and immediately begins its toxic action on the over-worked dust-eliminator cells (phagocytes) and subsequently on the other body cells and tissues, as the blood from the lungs goes directly to the heart and, therefore, to every part of the blood stream without having to go first through the liver. Thus, the respiratory system is a dead-end street without an officer to take care of the congestion. Although the workmen exposed to poisonous metals such as lead must be careful to avoid eating with dirty hands, it is far more important to prevent the inhalation of concentrated metallic dust or fumes.

C104. GENERAL CLASSIFICATION. The original big three (lead, mercury and arsenic) no longer stand alone as toxic agents. New alloys, new metal compounds and new metal processes present industry with many hazards of metal poisoning. In evaluating these new metals as hazards, the following facts may be considered:

1. A compound such as an acid salt of a metal may be poisonous although the pure metal may be harmless. The usual exposure is to a combination of fumes, gases and solvent vapors present with the metal dusts or fumes.

2. Injurious effects tend to arise from an accumulaton of small amounts rather than from a large single dose. Skin or membrane damage can result from both breathing and skin absorption.

3. The symptoms of metal poisoning may be altered and complicated by the toxic effects of several metals.

4. Harmful exposure is often limited to a specific occupation or process and may have no bearing on other processes in the same industry.

5. Diseases of a non-occupational origin may confuse or complicate the diagnosis. A complete medical examination and a thorough laboratory investigation are therefore necessary.

C105. COMPOUNDS. Elemental metals in pure form are rare in industry and, although their names are associated with injurious effects, in most cases it is the way they form compounds that determines their ability to do harm. Elemental zinc is believed to be non-toxic, yet freshly formed zinc oxide is a cause of zinc chills. Zinc sulphate is a corrosive agent and zinc chloride is a skin irritant. Pure aluminum is non-toxic. As aluminum fluoride, however, it may be very harmful.

C106. PHYSICAL PROPERTIES AS A FACTOR. It is generally recognized that the same metal may have both injurious and non-injurious compounds, depending upon such physical properties as solubility, atomic valence or combining power. Generally, those metallic compounds found to be insoluble are safe. Insoluble barium sulphate (used in X-ray work), for instance, presents little danger as a compound, but the soluble barium compounds are definitely harmful. Such insoluble compounds as lead silicate and lead titrate are not as toxic as the more soluble carbonate or the oxide. When swallowed, the insoluble lead silicate is relatively harmless because of its tendency to pass through the body without absorption into the blood stream. The very soluble lead acetate, on the other hand, is harmful because upon being swallowed it can easily be absorbed into the blood stream from the bowels.

C107. COMMON POISONOUS METALS. In industry lead is by far the most costly poisonous metal in lost manpower, medical expense and industrial compensations. Other common metal poisoning include the following: mercury or quicksilver; manganese; cadmium; chromium; zinc; arsenic; magnesium; phosphorus; antimony; nickel; barium; thallium; copper; selenium; tellurium; vanadium and radium. Up to the present time, as far as industrial use is concerned, the following metals are generally believed to be non-hazardous: tin, aluminum, gold, silver, cobalt, iron and titanium.

C108. ABNORMAL EXPOSURES. All metals, alloys or compounds have some harmful properties if present in the body in abnormal amounts. Physiologically, the normal person possesses and needs some quantity of many of the known

TECHNICAL FILE ON METAL POISONING

SAVE THIS VALUABLE REFERENCE MATERIAL: BUILD UP A PERMANENT OFFICE FILE

metals and these are found in the normal body fluids, tissues and waste products, It is the abnormal exposure to these same metals that may be poisonous because the normal balance of the body is disturbed.

C109. TOXICITY OF RARE METALS. The rarer, less familiar, metals are now being used to a greater extent for industrial applications. As new processes are developed new compounds will probably be found which will produce toxic properties. Uranium, and/or their compounds, for example, are believed to have toxic properties. All metals, in time, may find specific industrial uses as, for example, the unfamiliar metal, cesium, which is the only other metal besides mercury which exists in a liquid state.

C110. UNEXPECTED EXPOSURE. Buyers of toxic metallic-base substances are often unaware of the potential danger of the material because the manufacturer's labels do not show specific, intelligible warning of content, or because of a use which is not within the scope for which the substance was developed and delivered. Workers unwittingly may be exposed to a serious hazard from, say, a lead or chromium acid compound and often may suffer poisoning before the exposure danger is realized. As a familiar instance, the lead in "leaded steel" is a possible hazard in a non-toxic metal. The supervisor should be informed of the symbol or other expression denoting a known or suspected toxic metal contained in a purchase of a substance in either alloy or compound form. In the normal heating of zinc in foundries, the danger of metal fume fever is moderate, yet when zinc is alloyed to produce brass and is heated with copper, which has a much higher melting point, the zinc becomes much more volatile and the danger of fume fever correspondingly greater.

C112. SPECIFIC GRAVITY FACTOR. The rate at which a metal dust will settle to the floor is determined by its specific gravity. Dust from metals having a high specific gravity tend to clear from the air more quickly than the light metals. Because of this tendency, the hazards from the heavier dusts may be considered somewhat easier to control.

C113. MELTING POINT FACTOR. The point at which vapors form is determined by the melting point of the metal concerned. Where more than one metal is being melted down from ore, the metal with the lowest melting point will present the earliest danger. As metals are heated to their boiling points, dangerously dense fumes are produced. Fuming metals, such as mercury, that are already in molten form at room temperature, are a contsant threat.

C114. SOLUBILITY FACTOR. The solubility of metallic compounds is frequently, although not always, a good yardstick to use in determining toxicity. Many examples are available to show that a compound which is readily soluble in water, acids or alkalis is likewise soluble in the body fluids and, therefore, the same metal can be soluble and toxic in one compound form, while it is insoluble and quite harmless in another compound form. For example, barium sulphate, not soluble, is used freely and harmlessly in X-ray work. The sulphide and hydrate, however, are soluble and toxic.

C115. PHYSICAL PROPERTIES OF LEAD. Lead, or plumbum, is normally a bluish, almost silvery-grey, metal, very heavy, malleable and of very low tensile strength. It melts at 327.4 degrees Centigrade and boils at 1620 degrees. It has a specific gravity of 11.13. Lead protects itself from corrosion by forming a thin coating of gray oxide. Soluble in nitric acid and hot concentrated sulphuric acid. At ordinary temperatures, however, it withstands the action of most acids, and is only very slightly soluble in either cold or hot water. Lead and its compounds act poisonously on the body cells and reach the blood stream through inhalation, ingestion or skin absorption.

C116. COMMON POISONOUS LEAD COMPOUNDS. The following is a list of the more common poisonous lead compounds used in industry.

- Lead acetate (Goulardi Powder, sugar of lead)
- Lead arsenate
- Lead azide
- Lead borate (lead dryer)
- Lead bromate
- Lead fluoride
- Lead formate
- Lead hydroxide
- Lead lineoliate (lead plaster)
- Lead monoxide and basic monoxide (litharge)
- Lead bromide
- Lead carbonate and basic carbonate (white lead)
- Lead chlorate
- Lead chloride
- Lead chromate (chrome yellow dry) and basic (chrome red)
- Lead cyanate
- Lead cyanide
- Lead dichromate
- Lead dioxide (also brown lead oxide and lead peroxide)
- Lead dithionate
- Lead nitrate
- Lead oleate
- Lead phosphate
- Lead selenide
- Lead stearate
- Lead suboxide
- Lead sulphate (vitrolate or sublimed white lead)
- Lead sulphide
- Lead thiosulphate
- Lead tungstare and red lead
- Lead and tetraethyl

(To be continued)

LETTERS TO THE EDITORS

CONTINUED

very serious burns. You have our permission to use this picture in your magazine, OH, if you so desire.—Norman Dress, Personnel Director, Precision Castings Company, Cleveland, Ohio.

Thanks! A picture of this sort does more in teaching safety than a thousand words.—Ed.

Laboratory Hazards

OCCUPATIONAL HAZARDS:

We have noted, in the June 1947 of OH, an article titled, "Laboratory Protection?"

The article, as presented, is quite interesting and contributes many valuable ideas and suggestions which will improve the general safety of any laboratory in which hydrocarbons and corrosive substances are handled. There is a great deal of work necessary to be done before the average laboratory can be brought to the point where it is sufficiently safe to insure protection to personnel against explosives.

We are attaching a copy of the *Safety Manual for Operation of Copolymer Laboratories*, as it was printed by the U. S. Government Printing Office, from original material furnished by the Office of Rubber Reserve. We believe this to be the most complete and valuable work of its kind yet produced by any group. We felt you would like to announce to your readers the fact that copies of this Manual may be obtained from the Superintendent of Public Documents, U. S. Government Printing Office, Washington 25, D. C., at a cost of 25c each.—John T. Howell, Manager, Safety Section, Office of Rubber Reserve, Washington, D. C.

This 54-page manual is the most valuable piece of work on laboratory safety that we have seen in a long time.—Ed.

Fire Data Guide

OCCUPATIONAL HAZARDS:

Please send me Randolph Data Guide as outlined in your magazine OCCUPATIONAL HAZARDS. I wish to congratulate you upon your change from the small magazine to the large one you are now issuing. It is much easier to read and very well edited.—Ira J. Edelmann, Pioneer Cooperage Division of National Distillers Products Corp., St. Louis, Mo.

(Turn to Page 38)

New Products

CONTINUED

enough for a permanent piped system, but are too large for portable hand extinguishers. This equipment may be used as a fixed carbon dioxide hose rack, or may be picked up and carried to a fire. Cylinder bracketing is permanently fastened to a wall or column and quick opening clamps permit easy removal from its fixed position. Four carrying handles are provided.

Cylinder contains 50 pounds of carbon dioxide, and is fitted with 25 feet of one-half inch high-pressure hose terminating in a discharge horn, equipped with a "squeez-grip" valve. Weight: 240 pounds.

NP 155

FLOOR CLEANERS—The Tornado All-purpose Floor Machine and Tornado Industrial Vacuum Cleaner, manufactured by the Breuer Electric Mfg. Co., are now available. The manufacturer claims that these companion cleaners can be used with a

detergent on oily or crust covered floors with most satisfactory results to eliminate many employee hazards and dangers. Combination floor machine-vacuum cleaning greatly reduces time and labor for maintenance, providing a clean, safe floor for workers and improves production and morale. The floor machine can be used for scrubbing, polishing, waxing, sanding, steel-wooling or shampooing. Brushes are interchangeable.

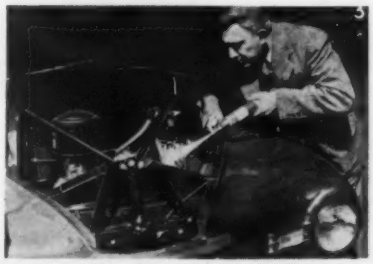
NP 156

INDUSTRIAL CONSOLE—Especially designed to afford factories, plants and large offices with complete voice-paging facilities, as well as "Music-At-Work," Executone's Inc., new, multi-purpose console, model P-20, contains in a single cabinet all the central control elements needed

in a sound system requiring up to 50 watts. A special channel control with "All-Page" feature is provided. This enables any one or all of six channels to be used for music, yet at the flick of a key, a voice message, emergency or otherwise, can be sent over all channels whether they are receiving music or not.

NP 157

TIREFLATER—Beacon Devices, No. Tonawanda, N. Y., now has available its recently developed "Beacon Tireflater" for inflating tires and putting out fires. The device is charged with carbon dioxide gas under pressure



and is said to inflate three average tires from flat to safe driving pressure. Fleet owners find the carbon dioxide charge gives added safety and non-conducting fire-smothering agent.

NP 158

. . . And Sudden Injury

Here's what a man looks like after 2300 volts of electricity goes through him. It's always a sorry sight, but it's worse when the man has met with death unnecessarily. The emergency crewman cutting the victim free is taking no chances of meeting the same fate. He is wearing the proper safety equipment and he is working very carefully.

And Sudden Injury

JOHN wasn't satisfied with the reception he was getting over his radio, so on a recent Friday afternoon he stopped in at the hardware store on his way home from work and picked up a length of copper wire. "That's the ticket for a good aerial," the salesman said.

After supper, John looked around his house for a good place to fasten the aerial. His eye fell on a nearby utility pole. He was sure that the electric company wouldn't mind one more wire leading from that pole. After all, it was strong enough to hold three large transformers plus the usual bewildering maize of mysterious wires.

John tucked one end of the aerial under his belt, and giving his wife a confident grin, started hand over hand up the guy wire of the pole. Only 32, he was proud of his strength. It was an easy climb for him, and he was sure his muscles wouldn't feel stiff in the morning.

John's wife screamed, but not loud enough to drown out the short anguished cry of her husband as 2300 volts of electricity crashed through his body. It was all over within a few short seconds. Once his body came into contact with the current it stopped being the strong, vibrant living thing that it had been.

The electric company dispatched their emergency crew to cut his body down from the utility pole. The crewmen worked quickly, silently and carefully. Even though they were fully equipped with safety equipment such as belts and gloves, they weren't taking any chances with the death waiting in those wires. They tried not to notice the dreadful burns on the man they were cutting down, but it was hard not to notice them because most of his clothes were burned off.

The man they finally lowered to the ground had died an unnecessary death. John, and many more like him, are killed needlessly each year because they thoughtlessly, carelessly or ignorantly blunder into contact with live electrical equipment they know nothing about. It takes a qualified expert to work around electricity. In the plant or at home, don't tamper with electricity. If any work in a plant needs be done with or around electrical installations, be sure that an expert is doing that work. And while he is working, take time out to notice the safety equipment he is wearing. Notice the care in which he does his work. It pays to be careful—it pays to stay alive!

GUARD AGAINST DERMATITIS

with **PLY** *the Before-Work Protective Cream*

14 Ply Formulas Meet All Recognized Industrial Dermatitis Hazards and Irritants

PLY is the registered name for the line of creams and liquids which provide *instant protection* against specific types of industrial skin hazards. PLY provides an invisible coating over the skin wherever applied protecting it like a glove from harmful irritants.

If you are not familiar with the wide range of PLY protection, we urge that you get the facts by writing for your copy of our book "The Answer to Industrial Dermatitis."

The only reference book of its kind "The Answer to Industrial Dermatitis" is of inestimable value to all concerned in combating industrial dermatitis.

PIONEERS IN RESEARCH FOR PREVENTION OF INDUSTRIAL DERMATITIS

THE MILBURN COMPANY

3246 E. WOODBRIDGE • DETROIT 7, MICH.

NEOPRENE HOOD IMPREGNATED

WORK GLOVES FOR *Safety* PLUS!

HOOD Work Gloves' scientifically compounded, specially bonded *Neoprene* surface *protects vital hands* from abrasion, acids, alkalies, chemicals, greases, oils, and other irritants. They keep hands safe, clean and dry. Special curving to the natural contour of the hand insures dexterity. Superior vulcanization by time-tested techniques results in still-usable gloves when others are worn out. Gauntlet model protects wrist and lower arms and the reinforced thumb crotch assures extra wear at this all-important point. Both models are Canton-flannel lined for added comfort. Let HOOD'S fifty years of leadership in the rubber industry be your guide to better work gloves. Since 1934—America's *Safety-Plus Glove.* Ask your jobber.

HOOD

HOOD RUBBER CO., WATERTOWN, MASS.
A Division of the B. F. Goodrich Company

LETTERS

CONTINUED

In Protest

OCCUPATIONAL HAZARDS:

We have read the article entiled "Plant Menace: Magnesium" in the May 1947 issue of OH and wish to register our objection to the publication of an article which presents magnesium in an erroneous and rather blatant manner. The title is definitely sensational and leaves the reader with the wrong impression. Recognized authorities in the fire protection field do not believe that magnesium is nearly as hazardous as is pointed out in this article. For substantiation of this statement, we refer you to the National Board of Fire Underwriters' Special Interest Bulletins No. 208 and 209 as well as the NFPA's Quarterly for July 1945. It is also our impression that the insurance underwriters of the State of California underwrite plants handling magnesium at the same rate as other plants, thereby indicating that they do not consider it a hazard. When such reputable authorities look on magnesium in this light, we feel that this article is being extremely unfair to the magnesium industry.—A. M. Lennie, Chairman, Educational Committee, the Magnesium Association, N. Y.

Our apologies to both the Magnesium Association and to Mr. H. J. Horswill, the author, for publishing an article which was originally written in 1940. Since that time, as Mr. Horswill pointed out in a letter to us immediately following the inadvertent publication of the article, "the use of magnesium has increased enormously and our knowledge of combating its hazards has increased correspondingly." We were in error. —Ed.

Glad To Help

OCCUPATIONAL HAZARDS:

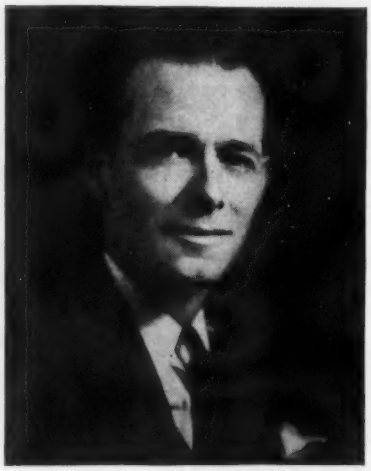
Upon reading my first issue of "OCCUPATIONAL HAZARDS" I find it very interesting and useful to me in my work. At the present time I am a Safety Engineer for an insurance company and we do a great deal of work with compensation risks in radio manufacturing. I would appreciate it very much if you would send some literature on this type of work. Also, I would like a copy of "Do You Know Your Trade Name Solvents"? information on "Carboblast" and any literature on machine shop guards. Walter J. Bauer, Jr., 3409 W. 60th Pl., Chicago, Illinois.

The requested information has been forwarded to you.—Ed.

MEN AND MATTERS

News • Activities • Plans

NEW SAFETY MANAGER . . . American Car and Foundry Company announces the appointment of Forest H. Humphreys as Manager of its Safety and Claims Division. Mr. Humphreys will have charge of safety and claims in all ACF plants, with his headquarters in New York. Humphreys is well known in the safety field, and has contributed a number of articles for national safety magazines. He conducted one of the first all inclusive eye protec-



tion programs in industry, and recently inaugurated the Wise Owl Clubs throughout ACF plants for workers who had saved an eye through the constant use of safety goggles. He is a member of the American Society of Safety Engineers.

STEPHENSON ENTERS RESUSCITATION FIELD . . . Announcement has been made of the organization of the Stephenson Corporation of Red Bank, New Jersey to make and distribute resuscitation and allied equipment. The new company is headed by William H. Stephenson. The corporation has acquired the Goodner Resuscitator, widely used by industrial corporations and fire departments on the Pacific Coast, and will build it with some refinements in several models at Red Bank. Development will be continued at the Glendale, California plant under the direction of M. Harry Goodner.

A feature of the policy of the new company will be a highly perfected program of training in the use of all the equipment it builds.

SCOTT AVIATION IN THE NEWS . . . Modern breathing equipment received its first known use under high atmospheric pressures recently while fighting a fire 100 feet under the East River in the Brooklyn-Battery Tunnel at New York City.

The unusual incident, attracting front page publicity and nationwide comment, was described by New York City Fire Personnel as one of the most potentially hazardous ever encountered, due partly to heavy concentrations of sulphuric acid fumes in the Tunnels, but mainly due to the necessity of using breathing apparatus in the higher-than-normal atmospheric pressures inherent in such tunnel construction.

A squad of five men, headed by a fire captain, all wearing Scott Air-Paks, battled the stubborn fire for four hours and successfully conquered it without ill effects or injury other than temporary deafness.

It was a tribute to modern fire-fighting technique and to modern breathing apparatus.

NEW PRESIDENT . . . Rudolf W. Staud is the newly-elected President of the Illuminating Engineering Society. He will take office as the 43rd president upon the expiration of retiring President G. K. Hardacre's term on October 1, 1947. The Illuminating Engineering Society is a national organization, founded in 1906, with over 5500 members with sections and chapters in 34 cities in the United States and Canada. It is the recognized national forum for the presentation and discussion of technical papers on the science and art of lighting.

President-elect Staud, an executive of the Benjamin Electric Mfg. Co., Des Plaines, Illinois, makers of lighting equipment, is a well-known figure in the lighting industry. He has served the RLM Standards Institute as its president since 1936.

FIRE PROTECTION FOR INDUSTRY

A SECTION IN WHICH ARE PRESENTED THE VARIED SPECIALIZED PROBLEMS AND SOLUTIONS TO FIRE FIGHTING CONTROL AND PROTECTION IN INDUSTRY

Measuring Flame Spread for Industrial Safety 40
"UL" Symbol of Safety 42
Static Electricity as a Fire Hazard 44
Check Your Sprinkler Valves! 46
Meet The Chief 47

MEASURING FLAME SPREAD FOR INDUSTRIAL SAFETY

Flame repellants are a large factor in fire prevention. Readily combustible structural finishes threaten the safety of the industrial plant of today.

THE flame-spreading characteristics of various wall and ceiling finishes in building structures have recently received considerable attention from such organizations as the National Fire Protection Association, American Standards Association, The National Bureau of Standards and the Underwriters' Laboratories. The latter has made extensive tests using tunnel-type methods on various building materials placed on an incombustible base to determine if present-day building code requirements are adequate. Fires are set in closed tunnels with various types of ceiling finishes and the results studied upon extinguishment.

Exit-ways, industrial and high hazard occupancies can now be built according to a rather complete "measuring stick" of finish construction designed to give maximum safety to life and property. The materials classified to date, shown in the accompanying table, are placed on a numerical scale, entirely relative, which gives some idea of the various rates of spread, and the time permitted for exits from structures having wall and ceiling fixtures as listed. Asbestos, having no spread qualities, is set as zero, with red oak lumber at the 100-point. The rate of flame-spread across a standard red oak plank, for example, provided a point arbitrarily set at 100 for a further basis of comparison with the time shown on tests of other materials of equal length.

Engineers from the Underwriters' Laboratories staff in Chicago examine the flame spreading characteristics of a building material which has been used as the roof of their testing furnace.

Hugh Robinson of the Underwriters' Laboratories staff has brought up the possibility of general building code changes as a result of these tests in speaking to the delegates present at the recent NFPA meeting in Chicago. He pointed out the need for sprinkler systems even on so-called "safe" finishes, and rated these finishes as follows:

1. Incombustible
2. Fire-retardant
3. Slow-burning
4. Combustible
5. Highly combustible

The fifth type of finishes have been ruled out by the majority of building codes, while numbers three and four have been permitted only on an incombustible base by the more modern codes. Obviously, much remains to be done on remedying old construction.

FLAME-SPREADING TABLE OF WALL AND CEILING FINISHES

Material	Flame-Spread Value	Material	Flame-Spread Value
Asbestos Cement Board	0	White Pine Lumber	130
Foam Glass (Cellular Glass)	8	Yellow Pine Lumber	130
Impregnated (Fire-Proofed) Lumber	25-60	Untreated Plywood	100-183
Repellant-Coated Lumber	30-65	Pitchy Pine Lumber	180
Treated (Fire-Proofed) Canvas	32-39	Cellulose Board	224
Treated (Fire-Proofed) Hair Felt	33	Hair Felt	240
Treated (Fire-Proofed) Plywood	38	Veneered (Glued) Wood	515
Treated (Fire-Proofed) Cellulose Board	50	Canvas in Folds	643
Red Oak Lumber (Numerical Standard)	100	Cotton Fabric in Folds	1600-2500
Douglas Fir Lumber	100		

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HERE is the new, "1947 model" of the G-E armor-clad electrode holder, materially improved and redesigned with *the operator's point of view* in mind. Light in weight, fully insulated, and amazingly cool in operation, it is also small, compact, and easy to use—and so well balanced that operator fatigue is materially reduced.

The gripping insert of the electrode slot is molded of heat-resistant plastic, *steel re-inforced*, to assure a tight, durable gripping surface. Yet electrodes can be changed by a slight twist of the hand. And the "no-waste" slot permits electrodes to be melted down to a short stub end without gumming the holder with spatter.

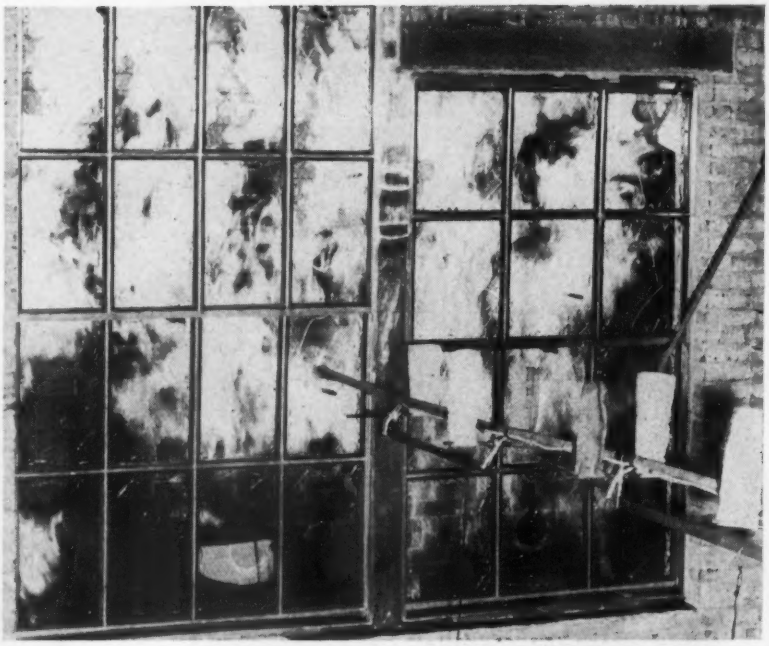
The head of the holder is encased in a sheath of aluminum armor to protect the insulation. Spatter won't adhere to this aluminum sheath; the holder stays cleaner—lasts longer.

With all of its advantages, this new General Electric armor-clad holder costs no more than many ordinary types. Order one today (Catalog No. 279X17) and judge for yourself. Your G-E Arc-welding Distributor can supply you. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

Most of the complete G-E welding accessory line, including helmets and handshields, spatter-resistant compounds, protective clothing, and tungsten electrodes, are described in the new Accessory Catalog, GEA-2704E. Ask your distributor for your copy.

SOLDERED CABLE CONNECTION assures good electrical contact, resulting in cool handle.
HANDLE is of molded fibre for strength, yet light in weight and comfortable to grip.
PUSH-UP ROD tightens electrode in firm "cushion grip" by slight twist of the hand. Insulated threads do not carry current.
ALUMINUM SHEATH protects insulation, resists weld spatter.
ELECTRODE SLOT holds electrode firmly at proper angle, precludes long, wasteful stub ends.
GENERAL ELECTRIC
672-80-8744

"UL"—SYMBOL



Fire-resistant wire-screened windows are actually built in as one wall of Underwriters' test furnace. After a 45-minute gas-flame test, a fire hose is played on the glass to see if the panes fall out. Records are kept on time required for the heat to ignite the pieces of fabric hanging outside.

Have you ever wondered at the U.L. label on the equipment you buy? Here's the story of some scientists who play with fire, electricity and explosives—to help protect your plant against fire loss.

PREVENTION of life and fire hazards, thefts and accidents, is the credo of Underwriters' Laboratories, Inc., a non-profit organization of engineers, technicians and inspectors that has been functioning in the interests of safety of life and property for 53 years. The familiar "UL" tag can be found on equipment as varied as egg-beaters and underground storage tanks, while published standards of approved items run into hundreds of different classifications, each approval having been made either at the main office and testing laboratories at Chicago, or at branch offices in New York and San Francisco.

Sprinkler Heads Tested

Ranged along a long wall in one of the departments in the five-story Chicago plant, which was built to fire-proof specifications by UL's founders, can be seen, for example, show cases loaded with sprinkler heads that have either been sent in by fire-protection manufacturers for test and approval, or by plant protection men curious as to the continous effectiveness of long-established automatic sprinkler systems. Some have been found inactivated by corosion or by heavy coats of paint. Some of them from California have been rendered inoperative because of wasp nests built into the sprinkler heads. In an adjacent room a UL engineer may be testing a huge coin-operated sandwich machine for possible fire hazards in the electronic device that cooks hotdogs in a matter of seconds. Another tests electric cords, using a bend and twist machine with a counter showing thousands of destructive pulls. Other departments have long benches of electrical appliances, from drills to large kitchen ranges, all under exacting tests for shock or fire hazard. (With regard to shock, the laboratories long ago arrived at the answer, by countless experiments, to this question: How much current can the average person safely stand? The answer was found to be 10 milliamperes!)

Fire Tests

Building construction comes in for fire as well as for casualty testing in a long section of the main floor at Chicago into which is built a horizontal furnace. Samples of the building materials are used as a roof of the furnace with gas flames projected on one end and readings taken of the flames progress, board temperature, etc., while photographic records are made and combustion gas samples are studied. Direct flame tests are also made on roof-covering materials, glues, plasters, windows, fire doors, brick, concrete, fire-retardant aids in modern fire-proof buildings.

In an explosion room, near a 30-foot tower from which safes are dropped on slag for testing, explosion-proof switches and motors receive an intensive going over. They are then allowed to operate at various speeds in chambers which are full of explosive mixtures. Water mufflers for plant trucks are tested for efficiency. The casualty and automotive departments are linked together in rooms used for testing

Test panel of a fire door being removed from the special panel furnace used by Underwriters' Laboratories to determine the fire-resistant qualities of fire doors.

OF SAFETY

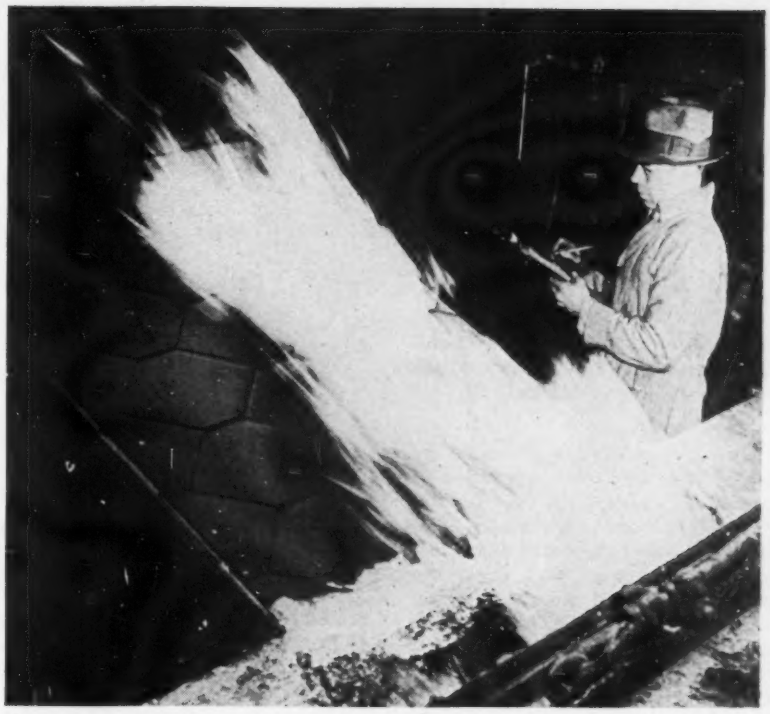
fuses, blowpipes, welding torches, elevator equipment, hoistway door interlocks, gas and flammable liquid fittings and guages and valves, ladders, lamps, anti-slip floor compounds and waxes.

Test Fire Hose

The chemical department is responsible for testing fire hose, flame arresters as used in oil storage tanks, industrial control equipment for use in hazardous locations, and all electrical fittings and fixtures designed for spark-proof use. A gases-and-oils division tests gases, furnaces, heaters, lighting plants, gas generators, tanks and fitting used for storage of flammable liquids, and the scores of fire extinguishers on the market. The standard test for a hand extinguisher, for example, is to pour exactly two gallons of gasoline into a four-foot iron tub, set it afire, and see if the extinguisher is able to put it out before the fire-fighting contents become exhausted. The UL label on such a product guarantees a uniform measure of security to the user.

In the hydarulic department, which is a vast network of pipes, pumps and valves, tests are run on couplings, valves, sprinklers, guages, pressure discs, pipes and hydrants, as well as automatic alarm systems.

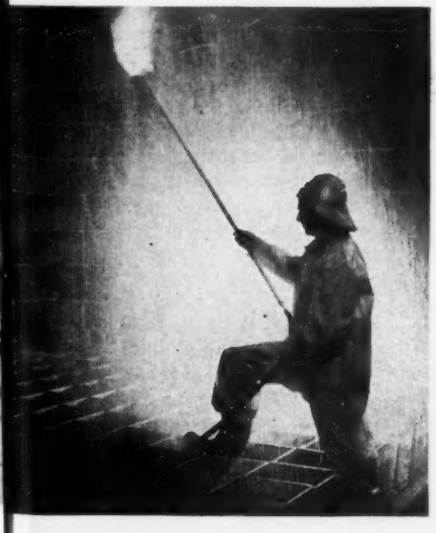
In all these tests, a manufacturer whose product passes the UL requirements can have an inspection service established for which a procedure is prepared illustrating details of construction, etc., of the product tested as well as a record of its performance. This report not only can be used as the manufacturer's guide for further production, but UL inspectors use it as a basis for re-examination and future periodic checks in the field.



Roof-covering materials are tested by direct exposure to flame. The material's fire-resistant qualities are thus accurately obtained.

Mobile Laboratory

For listed products tested in the field, UL men have a mobile laboratory with equipment housed in an automobile trailer. In this way cumbersome items or material to be inspected on the production line can be handled. The inspection label can be stamped, cast, or molded on the article approved, but if UL men purchase shoddy samples on the open market, or receive the same from users, all labeling service is withdrawn until the defects are corrected.



Distribution of water by an automatic sprinkler is carefully determined in the laboratory which is equipped with cross-sectioned walls and ceiling. The floor is covered with buckets, each one a square foot in area.

Research Endowed

In addition to tests and examinations, Underwriters' Laboratories endows scientific research on devices for life and property protection. Investigation of products is also made independently, upon complaint from users, although the latter usually refer to UL only such articles as carry the approved label. To the average person, such a label connotes safety from fire hazards, or effectiveness in fire-fighting, but a survey of the laboratory activities easily shows the entire field of casualty prevention is within its scope.

To quote from the UL's certificate of incorporation, its business is: "By scientific investigation, study, experiments, and tests, to determine the relation of various materials, devices, constructions, and methods to life, fire, and casualty hazards, and to ascertain, define, and publish standards, classifications, and specifications for materials, devices, constructions, and methods affecting such hazards, and other information tending to reduce and prevent loss of life and property from fire, crime, and casualty."

Static Electricity AS A FIRE HAZARD

Static electricity as a cause of fires in industrial plants is on the increase. There is no mystery about static charges. A knowledge of what it is and how it can be prevented will help reduce fires which are so caused.

Static electricity is produced by action of contact and separation of dissimilar substances. A rapidly moving belt develops static electricity as the belt comes in contact with, then moves away from, the pulley. Static is produced when liquids flow through pipes, when they fall through the air in drops or as a spray, when they are splashed around in tanks, and when air or other gases are bubbled through them. Gas issuing from a nozzle at high velocity may also generate static charges if it carries liquid or solid charges. Paper and cloth passing through machines take on static charges.

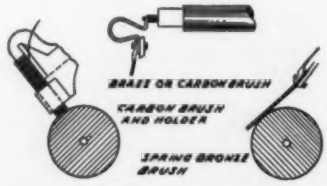
Prevention

If there is no way for static electricity to drain or flow away as formed, the charge builds up gradually. It may eventually develop a sufficiently high potential to cause a spark as the charge jumps a gap to a near-by ground or less highly charged object. Dangerous accumulations of static can be prevented by bonding and grounding, humidification, ionization, or a combination of these methods.

Bonding and Grounding

The cheapest and most effective way of preventing static accumulation is to ground the metal parts of a machine to a water pipe. A single ground wire connected to an all-metal machine at one point, however, may not be sufficient because paint, rust, corrosion or lubricating oil may insulate one point from another.

All these parts should be bonded together or grounded separately, and revolving metal parts kept clean to avoid insulating effect between the parts and the grounding device. Graphite mixed with the lubricating oil will sometimes serve as a satisfactory grounding for revolving parts, but it is safer to provide a



grounding brush or wiper which contacts the moving part.

Static Collectors

Static electricity generated on materials in machines can be eliminated by using various types of static collectors. Tinsel bars or wire

bristles set in metal are considered good collectors. The collectors need not be in contact with the stock-in-process. They are subject to injury and will eventually pick up insulating material if they are in direct contact. A distance of ¼ or ½ inch from the stock will not impair their effectiveness.

Power Belts

Static electricity can be removed from fast moving belts by the use of grounded collectors, by the use of a dressing which makes the surface of the belt a conductor, or by the use of special belts of conducting material.

Humidification

If the moisture content of the air is kept at 60 per cent relative humidity or more, there is small chance of static charge collecting to a dangerous potential. The reason for this is that the high moisture content deposits a thin conducting film of moisture on most objects which conducts the static charge, thus grounding the charge as quickly as it is generated.

Humidification may be obtained by means of steam jets, unit humidifier, or air-conditioning and ventilating systems. Unless automatically controlled, humidty should be checked periodically with a hygrometer.

Ionization

Though air is ordinarily a nonconductor of electricity, it can be "ionized" so that it contains electrically charged particles that will conduct static electricity to grounded parts of the machine. Ionization may be produced by high temperature or by the silent discharge of a high-potential electric current.

Detecting Static

Static electricity may be detected in several ways. If a piece of cotton thread is held near the object to be tested, the fibers of the thread will stand away from one another if static is present.

A gold leaf electroscope may be used, though in its ordinary form it is not well adapted to general use in a manufacturing plant.

The neon-tube tester makes a satisfactory, inexpensive, and portable instrument for detecting static charges. If static is present, the gas contained in the tube conducts part of the charge from the point of contact, causing the tube to glow or flash.

To indicate both the presence of a charge and the voltage of the charge, a static voltmeter should be used. It is not well adapted to portable use in plants.

Though the generation of static electricity cannot as a rule be prevented, there are means of preventing dangerous accumulations. Whatever method you use, as long as it is an effective one, consider your efforts worthwhile because you might well have prevented serious trouble in your plant.

Especially this year...

PROTECT WHAT YOU HAVE

Buffalo VL Extinguisher

● Replacements...whether these be buildings, equipment or stock...continue to be in scarce supply and in every instance much higher in price. So it is only good management to *guard what you have.*

Protect against fire by installing dependable fire-fighting equipment at *every* vulnerable location. Don't allow a small fire to grow destructively big during those crucial moments it takes to bring an extinguisher from one department or floor or building to another. Be prepared to fight any fire *instantly.*

We suggest those extra extinguishers you need, and which should be added immediately, be Buffalo *better-built* Fire Extinguishers. Now is the time to talk to your Buffalo representative who probably is listed in the classified section of your telephone directory. If he isn't, please write directly to us.

Buffalo FOAM-TYPE Extinguisher

Buffalo SODA-ACID Extinguisher

BUFFALO *better-built* **FIRE EXTINGUISHERS**

ESTABLISHED 1895

BUFFALO FIRE APPLIANCE CORPORATION

DAYTON 1, OHIO

CHECK YOUR SPRINKLER VALVES!

Careful supervision aided by recommended practice of weekly inspections, sealing and use of red tags will cut down fire losses due to improperly closed sprinkler valves.

AUTOMATIC sprinklers are the best single safeguard against disastrous plant fires provided that they are not neglected. Long experience has proved the effectiveness of automatic sprinkler systems, and their record of accomplishment justifies the sense of security which management feels when their plant boast complete automatic sprinkler protection.

Water Supply

Automatic sprinklers, however, must have an ample supply of water continuously available at the heads. Though the provision of good water supplies is a matter of engineering in the oringinal installation, the problem does not stop there. Having the water available at the sprinkler heads requires constant supervision and maintenance by management to insure that sprinkler controlling valves are kept open. If a sprinkler valve is shut when fire breaks out so that the sprinkler system is useless, the money which has been spent for the automatic protection is wasted. Slower and less effective methods of fire fighting must be used, resulting in greater damage and larger loss. It is unsafe to presume that in case of fire the valve can be opened quickly in case it is found to be turned off. Many times access to the valve will be cut off in the very first stages of the fire. In other cases, the excitement of the fire might cause everyone to forget that the valve was closed.

Delay is Serious

Even if someone opens the valve, it is quite proable that the delay will be sufficient to allow the fire to gain considerable headway and seriously extend the damage. Because of the fire spread, many more heads will open after the main valve is opened which will result in much more water damage. If many heads are opened, the supply of water is diminished, and this factor might affect the effectiveness of the entire system. When many heads are in operation, the water supplies can be overtaxed to such an extent that the sprinklers will be unable to control the fire. If the delay is great, the piping may drop, thus rendering the entire sprinkler system useless.

Safety Procedures

The first sprinklers were installed in 1875 and quickly demonstrated their value in fire-fighting. Such "failures" as did occur were usually not the fault of the sprinklers, but of conditions which prevented them from operating. The danger of closed valves was early recognized as well as the realization that this danger could, in a large degree, be prevented or reduced by the following simple precautions:

1. *Weekly inspections.* Inspections on a regular weekly basis will occasionally reveal valves closed, overlooked and forgotten.

2. *Red Tags.* The danger of closed valves give many plant protection men cause for serious concern. Several companies have developed red warning tags to put into use an effective method of keeping a check on closed valves. Before closing any valve, a permit should be obtained from a responsible official who signs the red tag to be hung on the closed valve. A duplicate stub should be hung in the official's office as reminder to reopen the valve.

3. *Valve Sealing.* The Factory Mutual Fire Insurance Companies found that sealing valves is an efficient method of keeping track of the condition of the valve. This is particularly true in the case of new construction on old buildings where many changes and additions are made to the sprinkler systems.

Objectives

The general object of all systems used to keep check on sprinkler systems may be summarized as follows: *To make sure that sprinklers are shut off only when it was safe to do so, for as short a time as possible, and with certain extra precautions; also to make sure that valves are re-opened and re-sealed when the work is finished.*

Improperly Closed Sprinkler Valves *

Kinds	How Prevented	How Discovered
Valves shut for repairs or other reasons and left shut and forgotten	By following suggested precautions during shut-offs: —Notice to Insurance Company —Use of red tags —Drain tests —Valve sealing	Weekly inspections
Valves in minor unheated areas closed in winter to prevent freezing; not reopened in the Spring	Proper supervision Use of green tags	Weekly inspections
Valves closed by unauthorized persons without knowledge of men in charge	Seals discourage tampering Wrenches should be removed from valves in locations accessible to outsiders	Weekly inspections
Valves apparently open but actually shut due to mechanical defects	Care in installation, operation, and maintenance	Drain tests Trying indicator posts

MEET THE *Chief*...

OCCPATIONAL HAZARDS will bring to its readers each month the true, inside story of an industrial fire AND HOW IT HAPPENED. Each story will be told by a man who heads the fire department of a large city. These authentic observations by men who devote their lives to fighting fire and to the study of fire hazards are presented to the readers of OCCUPATIONAL HAZARDS in the hope that each story will be of value to those persons responsible for fire protection in industrial plants throughout the country.

This month's guest writer is Chief William H. Davies of the Pittsburgh Fire Department. Chief Davies joined the Department in 1916, was made a Battalion Chief in 1930 and Chief in 1943.

USE YOUR FIRE DEPARTMENT

BY CHIEF WILLIAM H. DAVIES
Pittsburgh Fire Department

MY EXPERIENCE, sadly enough, has indicated that many persons responsible for the fire protection program of industrial plants consider their local fire department as an agency to be called only in the event of a major conflagration. It is only then that the fire department is called into the plant fire prevention picture—a picture often framed in blackened wood and twisted steel girders . . .

Much property would be saved and many lives spared if every industrial plant in the country would invite their local fire department into their fire prevention program at its inception. If management gave their local fire department a complete list of the materials being used in their plant; if management would invite their local fire department to look over the plant—then the fire prevention program of the plant would have a much better chance of success.

My reason for wishing that management would *cooperate* (there, the word is finally out!) with their local fire department is two-fold.

1—In the case of fire, the fire department will know what to expect—what they are getting into—because they will know what is burning inside the building. Knowing this, they can use proper equipment and methods in the extinguishment of the fire. This results in a minimum amount of property damage besides reducing the hazards to personnel.

2—Upon receiving the list of materials being used, and upon going through the plant, the local fire department can make valuable suggestions that, if followed, can prevent most of the fires from starting in the first place. Through years of experience in fighting fires, the hazards of various chemicals and manufacturing set-ups are known to the fire department. This information is very valuable and it is free for the asking. Why not use it?

During the war the Pittsburgh Fire Department responded to an ADT alarm from the Watson-Standard Paint Company. We knew nothing concerning the materials being used at this plant. While fighting the fire a violent explosion took place which resulted in the death of three of the firemen and a $525,000 property loss. Eighteen firemen and civilians were taken to the hospital with serious injuries.

It was later discovered that this plant was using a chemical designated by the government as GX-800. This was used in connection with the manufacture of paint. It was stored in an above-ground tank some 150 feet from the main plant building. It flowed through a pipe from the tank to the basement of the main building and was there drawn off into 100 gal. steel drums by spigot. The drums were put on an open elevator and sent up to the third floor where the mixing took place.

The original fire was caused by an employee who knocked over one of these drums of GX-100 which then ignited.

The pipe through which the chemical flowed should have been grounded to prevent static. This had not been done and it is felt had much to do with the explosion. The basement was not sufficiently ventilated for the type of material being handled there. A good system should have been installed to prevent accumulation of fumes. The only "ventilation" was in the form of a single window. This, of course, was not nearly sufficient for the purpose.

Fire stops (walls and fire doors) were completely inadequate throughout the plant and considering the materials being handled, this was a grave error. Because of conditions existing in this plant, a CO_2 flood system should have been installed instead of an ordinary automatic sprinkler system. The latter are excellent in many plants and are vital to plant fire protection, but in cetain isolated cases such as this they are actually harmful. Here, a CO_2 flood system was obviously called for.

Vapor-proof globes should have been installed and spark-proof electrical equipment should have been

installed in this extremely hazardous room.

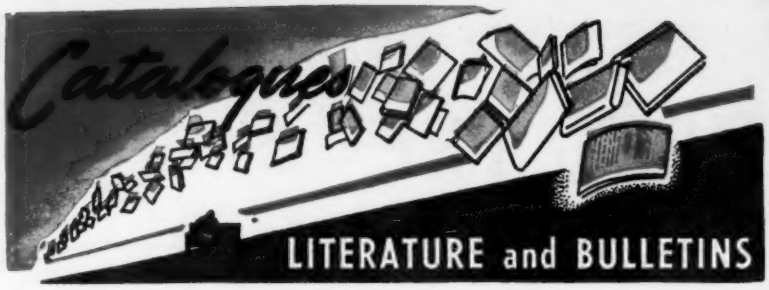
This is an example of what happens when there is no cooperation existing between plant management and the local fire department. If the fire department had been invited through this plant, they would have pointed out the above mentioned hazards, and if they had been corrected, the disasterous fire and explosion might never had occurred.

There are certain precautions to be taken, both from the standpoint of extinguishment and from the standpoint of prevention when certain chemicals are involved. It is important to both management and the fire department that the latter know that these certain chemicals are being used in the plant. Metallic sodium and nitrate baths will cause violent explosions if water is thrown on them. If nitric acids are present in a fire, fumes will kill unprotected persons coming into contact with them. Calcium carbide will immediately generate acetylene if water is brought into contact with it. For this reason, calcium carbide should always be stored in a dry place in a separate building from the main plant. If it is stored in a main building and should a fire start there, water from the fire hoses would generate acetylene which would, of course, explode upon finding the fire.

Bottled Gas

Recently a safety engineer informed me that due to the natural gas shortage his plant was relying extensively on bottled gas. Heat expands this gas and it escapes through the relief valves provided on the cylinders. Being heavier than air, the gas will settle and in case of fire in the same building will eventually find a source of ignition and explode. After informing this safety engineer of these facts, he had the cylinders stored in a separate building fifty feet from the main plant.

There isn't any fire that could not have been prevented before it started. A fire in an industrial plant means loss. It means loss to management and loss to employees. To insure that fire will not raze your fire protection program, I sincerely urge each and every person responsible for plant protection to call in his local fire department. *Talk things over! Walk around the plant! Perhaps a simple thing like grounding a pipe will prevent your plant from suffering a major fire loss!*



The publications featured on these pages were written by experts. They may be obtained without charge. To obtain these use the postcard bound into this issue.

FL-640 . . . Comprehensive foundry dust control and ventilation are presented in a 32-page booklet, "Schneible in the Foundry Industry," prepared by the Claude B. Schneible Company. The new booklet expounds the important engineering principles which should be included in a dust and fume collection system.

FL-641 . . . Three important booklets are now available from the Union Wire Rope Corporation. Titles of the booklets explain their contents which are complete in every detail. Titles: "Splicing Wire Rope," "Socketing Wire Rope," and "Correct Handling of Wire Rope."

FL-642 . . . Two descriptive bulletins have been prepared by the Rochester Can Company. Bulletin No. 18 describes their Iron Horse Cans for oily waste-rags and inflammable materials. Bulletin No. 237 describes their line of galvanized pails and buckets, including their extra-weight fire pails in either round or flat bottom styles.

FL-643 . . . A folder prepared by the Durable Mat Company illustrate the many safety, health and sanitary features which are incorporated into their line of floor mats. The many models of mats are designed to prevent slipping on inclines or on wet floorings, to reduce fatigue from standing on hard flooring and to clean the foot and trap dirt outside.

FL-644 . . . The new Stephenson Resuscitator is described in a four page booklet by the Stephenson Corporation. Unusual is their "Midget Attachment" which makes possible the resuscitation or inhalation of two patients at once from the same apparatus. By means of a long hose, the attachment can be used to resuscitate a person on the top of a building, or in a basement, cave-in or other places beyond easy reach.

FL-645 . . . An 11-page booklet with many illustrations describes the new Hopperwood "Fire-Chief" canvas. The booklet describes the many characteristics of the treated canvas, including its resistance to fire, water, wear, weather and mildew. The material can be used, among other things, for welding curtains, warehouse tarpaulins, and truck covers. It has been approved by both the Factory Mutual Laboratories and the Underwriters Laboratories.

FL-646 . . . The safeguarding of life and property is the subject of the Gamewell Company's new 19-page booklet. The manner in which their "Vigilarm" system automatically discovers fires, warns building occupants and summons the fire department is intelligently discussed. The system is claimed by Gamewell to bring complete assurance that no fire, however small, can begin its destructive work without sounding an immediate, automatic alarm.

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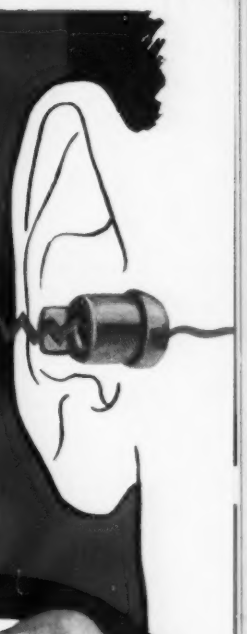
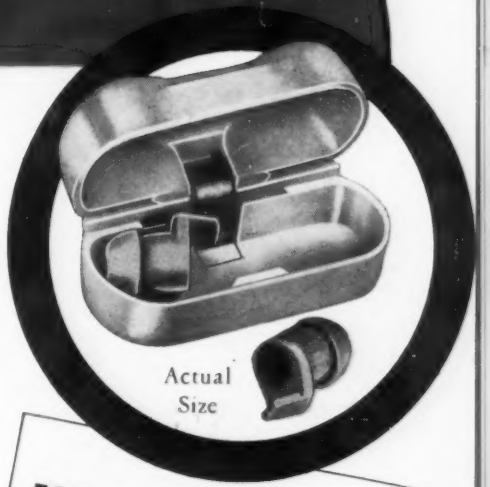
Reduce harmful NOISE and Increase Production!



M·S·A Ear Defenders



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Scientifically Designed to Filter Distracting Noise—

—yet speech is readily heard!

Loud noises are harmful—irritate nerves—cause fatigue—reduce efficiency. *Protect* your workers and gain in production output by reducing noises *at the ear level* with M.S.A. Ear Defenders!

M.S.A. Ear Defenders absorb loud sounds, reducing them to a fraction of their original intensity, yet permit transmission of speech due to unique acoustical design. Proved throughout industry, and by hundreds of thousands of users in our Navy during the war, M.S.A. Ear Defenders are soft, flexible, easy to keep clean with soap and water, and are supplied in a sturdy, spring-hinged plastic carrying case.

FOR BETTER EAR COMFORT ON THESE AND OTHER NOISY JOBS!

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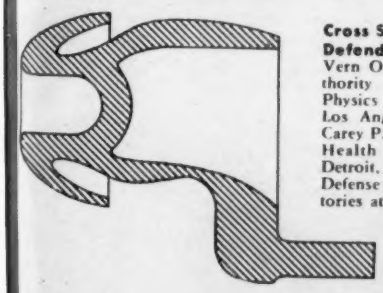
- Drop Hammers
- Hydraulic Presses
- Automatic Riveters
- High Speed Grinders
- Pneumatic Tools
- Screw Machines
- Wood Planers and Saws



Cross Section of the M.S.A. Ear Defender. Based on studies by Dr. Vern O. Knudsen, a recognized authority on acoustics, Professor of Physics at University of California at Los Angeles, cooperating with Dr. Carey P. McCord, M.D., of Industrial Health Conservancy Laboratories, Detroit, Michigan, and National Defense Research Council Laboratories at Harvard University.

Write for Descriptive Bulletin No. HA-3!

OCCUPATIONAL HAZARDS **Magazine goes to every important industrial plant in the United States through its Jobber Representatives . . .**

OCCUPATIONAL HAZARDS **Magazine's unique circulation method, whereby subscriptions are paid for by distributors of Safety Equipment, assures complete coverage of all plants with worthwhile buying potential.**

Salesmen—150 of them—working for twenty-six strategically located safety equipment distributors throughout the United States visit these plants every few weeks. These salesmen KNOW who buys safety equipment in each plant and they make sure that these buyers are receiving OCCUPATIONAL HAZARDS

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